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A PRELIMINARY SURVEY OF THE
TYPES, INCIDENCE AND
RECORDING OF HOSPITAL
INFECTION*

PETER WARNER, M.D., Ph.D.,†
S. E. PARKER, M.D., B.Sc.‡ and
K. M. CLEARWATER, Winnipeg, Man.

DISEASE resulting from infection acquired in hospital has been the active concern of the medical profession since the time of Florence Nightingale,¹ who about 100 years ago said, "It may seem a strange principle to enunciate that the very first requirement in a hospital is that it should do the sick no harm." Since that time many dramatic and obvious advances have occurred in the prevention of infectious disease acquired in hospital. However, in the last decade, concurrent with and perhaps because of an increasing interest in such disease, it seems to have become increasingly difficult to diminish its incidence and to assess the effects of preventive measures upon it. Part of this difficulty is the result of an imprecise knowledge of the nature and extent of "hospital infection" in any particular hospital at any time. Without such knowledge the extent of variations in incidence of infection is unknown, and the distinction between epidemic and inter-epidemic periods is difficult. Furthermore, the effect of preventive measures cannot be gauged, for however ingeniously we devise bacteriological tests, the ultimate test of the value of any preventive measure will be its effect on the incidence of disease resulting from infection acquired in hospital. Emphasis has been laid upon infections contracted in hospital and little attention has been paid to those people admitted with infection; this ignores the possibility that the amount of infection contracted within a hospital is governed by the number of patients admitted with infection.

There are very few reports of the incidence and type of all disease resulting from hospital infection that have occurred in individual institutions, according to Williams *et al.*,² who quote the surveys

of Watkins and Lewis-Faning,³ Cree and Mann⁴ and Goodall,⁵ the first two are concerned only with children. On the other hand, there are numerous accounts of so-called "epidemics"; Williams⁶ is unable to define these more precisely than: "... those circumstances that prompted publication or investigation as examples of an undue prevalence of infection". More recently, an attempt has been made to determine the incidence of infection in a general hospital in Philadelphia⁷ but the survey was confined to staphylococcal infections.

In certain special circumstances such as post-operative wounds, the incidence of sepsis in non-epidemic periods has been frequently surveyed, even before 1935 when Meleney⁸ emphasized the discrepancy between the actual incidence of wound sepsis, 15%, and the surgeon's impression of it, 2%. Most of these surveys have been condemned since as "almost useless" because they were retrospective and only sepsis of the grossest kind is recorded in clinical records.⁹

Because of relative ignorance of the type and amount of disease resulting from infection while in hospital, it was decided to analyze the reported infections occurring in the Winnipeg General Hospital during the years 1958 and 1959. Also, to obtain some idea of the efficacy of the reporting method, it was decided to make retrospective reviews of random (in the statistical sense) samples of the records of patients from whom staphylococci had been isolated or who had undergone surgery during the relevant period.

The purpose of the investigation was to establish a method of infection reporting that would be economical in time and money and that could be applied to the whole of a large hospital for an extended period. We realized that at the beginning the reporting of infections would be far less efficient than a survey of every patient for signs of infection, but felt that the use of infection reports was the only practical way of collecting information to provide a comprehensive picture of hospital infection. With the passage of time, we hoped that the procedure would become accepted by the various segments of the hospital community as a device for gaining knowledge of hospital infection and that they would collaborate, in a spirit of enquiry, to bring the procedure to a high degree of efficiency for the benefit of their patients.

*From the Bacteriology Department, The Winnipeg General Hospital, Winnipeg, Man.

†Director, Bacteriology Department.

‡Assistant Bacteriologist.

MATERIALS AND METHODS

In 1958 and 1959, the Winnipeg General Hospital was a large general teaching hospital situated in a fairly rapidly expanding medical centre which included a children's hospital, tuberculosis clinic and hospital, women's hospital and associated nurses' and other residences. The Winnipeg General Hospital itself consists of a main conglomeration of buildings containing general wards ("Main Hospital") and at some distance from it the women's hospital ("Women's Pavilion") connected by underground tunnels. The psychopathic hospital, though under separate administration and medical staffing, was served by the General Hospital which provided laboratory, x-ray and other services. The other elements of the medical centre were under separate administration and staffing but some were connected by underground tunnels and all were visited by medical students, medical practitioners, nurses and other staff; this provides an extremely complex epidemiological situation because none of the hospitals or institutions in the centre was isolated and it was possible for infection to be carried from one to another.

The survey of infections is confined to the Main Hospital, the Women's Pavilion and the Psychopathic Hospital; institutions which had a common administrative procedure for reporting infections. This group will be referred to as the General Hospital.

During 1958 and 1959 the General Hospital, with a rated capacity of 824 to 864 beds, had a daily census of patients which varied between 700 and 800 although the number of "patient-days care" provided rose very slightly and gradually. Considerable rebuilding and reorganization was being carried out during the survey period. In the Main Hospital the beds were divided into Medical, including clinical investigation wards, and Surgical, including general, urological, orthopedic, ear, eye, nose and throat and neurosurgical beds; more surgical than medical care was given during the survey. Some gynecological surgery was performed in the Main Hospital and the remainder in the Women's Pavilion; the obstetrical service and associated nurseries were situated in the Women's Pavilion, and a children's ward, which has since been closed, was housed in the Main Hospital.

Most of the wards were in single or double rooms, an arrangement different from many other hospitals. Only a few wards had more than a dozen beds in them. The attending medical staff might have patients on different wards and the hospital was not "closed", that is, used by an appointed attending staff only, but was open to any physician with the appropriate credentials.

Method of Infection Reporting

Infections were reported by completing two copies of a "Notice of Infection" form, devised by Drs. Bradley, Bartlett and Wilt of this hospital, on

which the patient's identification was stamped with an "Addressograph". The form was divided into three parts. The first was completed by a nurse from information in the patient's record and consisted of (1) the diagnosis on admission, (2) the date of appearance and the type of sepsis or disease, which was often specifically described, e.g. "boils", "stitch abscess", "marked wound discharge" divided into three groups of increasing severity, and a fourth group comprising "communicable diseases". (3) If the infection was of a postoperative wound, the nature and date of operation were recorded with the relationship between the recognition of infection and the first dressing. If it was not postoperative, the site of infection was noted and whether it occurred before or after admission. The second part of the form was left for the intern's description of the sepsis and the third for the remarks of the attending doctor. One copy of the "Notice of Infection" form was placed in the patient's records while the other was sent to the office of the Department of Nursing and then to the authors in the Department of Bacteriology.

Recording of Information

The information on the "Notice of Infection" form was entered on edge-punched cards;^{9,10,11} the patient's record was obtained subsequently and additional information requested by the authors was entered on them. In a surprisingly large number of cases patients' records could not be obtained; these were requested first by a secretary and when not available were watched for, during a six-week period, and subsequently a final search was made in June 1960, six months after the end of the survey period. A code was prepared and the cards made ready for sorting on a knitting needle by punching out the edges of the appropriate holes.

The Random Samples

In order to obtain samples that are random in the statistical sense, lists of the entire population of objects to be sampled are required;¹² it is remarkable that no list of all the patients in hospital during any period was readily available. We kept all copies of the daily lists of surgical operations to obtain one such list. This provided a sample for the investigation of postoperative sepsis. The other list used was the Bacteriological Laboratory daily register, which records all specimens received; the coded results of these examinations were entered on the cards.

The random sample of the operating list was drawn from the six alternate months in 1959 starting with January. All operations performed, excluding all endoscopic procedures such as cystoscopy and ear, nose, throat and eye operations, were numbered serially in chronological order. This process sampled the operations carried out in ten of the operating

*Analysis Card, Standard form Y9 (8" x 5"), manufactured by Systems Equipment, Winnipeg.

TABLE I.—DISTRIBUTION OF INFECTIONS ACCORDING TO INFECTION REPORTS RECEIVED

Section of hospital	Relation of infection to admission to hospital	1958		1959		Total		Average No. per week both years
		Number	Per cent	Number	Per cent	Number	Per cent	
Main	Before	279	50	240	44	519	47	5.00
	After—postoperative	107	19	98	18	205	18	1.97
	“ —other	52	9	54	10	106	10	1.01
Gynecology	Before	5 (11)*	3	9 (25)*	6	50	4	0.48
	After—postoperative	6 (1)	..	12 (9)	4	28	3	0.27
	“ —other	1 (4)	..	1 (3)	..	9
Obstetrics	Before	25	4	26	5	51	5	0.49
	After—postoperative	2	..	5	..	7	..	0.07
	“ —other	4	..	3	..	7	..	0.07
Nurseries	After	12	2	22	4	34		0.33
Hospital staff		53	9	44	8	97		0.93
Totals.....		546 (16)		514 (37)		1113		
		562		551				

*Figures in parentheses are gynecological cases admitted to the main hospital; the others were admitted to the Women's Pavilion.

.. Between 0 and about 1%.

theatres. A number in the first operating list was selected at random and thereafter every tenth patient's name was recorded. The patients' records were obtained and details relevant to infections and the administration of antibiotics were transferred to edge-punched cards and prepared for analysis in the manner described above. From the total number originally selected we subtracted the patients whose records were unobtainable and those in whom the operations planned were not carried out.

The random sample of patients from whom staphylococci were isolated was obtained by numbering consecutively all specimens recorded in each month from which staphylococci were isolated. Each month's specimens were divided into two equal groups when this was possible; otherwise the odd specimen was assigned to a group by the toss of a coin. Using a table of random numbers, 25 specimens were selected from each of the two groups to provide 600 specimens for the year. This total number was not kept intact

because some specimens were coded in error or listed incorrectly; some patients' records were unobtainable, others had no infection recorded in their charts (i.e. they may have been nasal carriers or the staphylococcus could not be associated with any recorded infection), and some septic lesions were duplicated when two specimens were obtained from the same lesion. However, different infections in the same patient were recorded separately. The randomization procedures may not have been sufficiently thorough and this should be considered when weighing the significance of the results; however, we accepted it as adequate for a preliminary survey.

RESULTS

Preliminary Breakdown of Infections and Relation to Admission

Table I shows the distribution of infections according to the sections of the hospital in which they originated. During the period of the survey

TABLE IA.—INFECTION RATES IN DEPARTMENTS, JANUARY 1958 TO JUNE 1959

	Infection present		Discharges	Patient days	Rate per 1000 patients		Rate per 10,000 patient days	
	On admission	After admission			On admission	After admission	On admission	After admission
Medicine.....	35	17	6561	94,962	5.33	2.59	3.69	1.79
Surgery.....	114	72	5894	75,766	19.34	12.21	19.34	9.50
Neurosurgery.....	6	6	1060	11,065	5.66	5.66	5.42	5.42
Neurology.....	2	3	1293	21,337	1.55	2.32	0.94	1.41
Gynecology.....	8	4	2785*	21,327*	2.87	1.44	3.75	1.88
Pediatrics.....	4	3	94	3058	42.55	31.91	13.08	9.81
Eye, E.N.T.....	1	0	2376	14,491	0.42	0.00	0.69	0.00
Urology.....	1	10	1494	25,386	0.67	6.69	0.39	3.94
Dermatology.....	1	2	20	409	50.00	100.00	24.45	48.89
Orthopedics.....	40	26	2822	42,408	14.17	9.21	9.43	6.13
Dentistry.....	0	0	54†	146†	0.00	0.00	0.00	0.00
Nurseries.....	0	16	6167*	14,939†	0.00	2.59	0.00	10.71
Obstetrics.....	8	4	6385*	14,519†	1.25	0.63	5.51	2.76
Totals.....	220	163	37,005	339,813	5.95	4.40	6.47	4.80

*The 1959 value was obtained by halving the year's total.

†Figures available for 1959 only.

‡Figures were available for 1959 only and the value was obtained by halving the year's total.

some gynecological patients (recorded in parentheses in Table I) were admitted to the Main Hospital but were submitted to operation in a theatre separate from other cases; other gynecological patients were also admitted to the Women's Pavilion; but since the survey was completed all gynecological patients have been admitted to the Women's Pavilion. For purposes of tabulation these patients have been kept separate although it is obvious that they are not necessarily separate in the epidemiologic sense. However, this movement of patients caused no detectable error in our findings. In the Women's Pavilion, the gynecological patients are separated from the obstetrical patients and the newborn nurseries; they have been tabulated separately because the problems in the three types of patients are different.

A comparison of the experience of the years 1958 and 1959 shows that there was no great change in incidence of infection; in fact, the total number of infections reported diminished from 562 to 551 and those patients who contracted infection before admission to hospital diminished in a fairly marked degree from one year to the next. On the other hand, in the gynecology department those infections acquired before admission and postoperatively were more than doubled in 1959, in comparison with 1958, although the total number involved was small. In the nurseries, the numbers of infections reported are small but 22 were reported in 1959 compared with 12 in 1958. These changes are referred to subsequently in connection with control charts, but otherwise the figures in the subdivisions of Table I are very similar for the two years; no great change had occurred.

There were two to three times as many reports of patients who had infections on admission to hospital as of patients who contracted infection after admission; according to this observation the bulk of infections in hospital consists of those admitted with infection. Of the infections reported as occurring after admission, in the Main Hospital and on the Gynecology Service, it seems that the postoperative type are twice as large as any other group.

Infection Rates in Departments

Results of infection rates according to departments are shown in Table Ia. Although compiled from infection reports, these results were collected for another purpose at a different time and in a different way; there may be minor discrepancies between the results in this table and all others. When interpreting these results, it must be remembered that patients in different departments are not necessarily geographically separated from one another; for although some wards are designated surgical and others medical, one person from each department may share the same room.

Table Ia illustrates the variation in incidence of infections in different departments. If derma-

TABLE II.—TEMPORAL INCIDENCE OF REPORTED INFECTIONS EXCLUDING HOSPITAL STAFF

	<i>Present on admission</i>	<i>Present after admission (other than postoperative)</i>	<i>Post-operative</i>	<i>Total</i>
1958				
January	17	4	6	27
February	34	5	5	44
March	26	7	23	56
April	25	2	6	33
May	33	1	3	37
June	25	9	8	42
July	21	8	10	39
August	35	3	14	52
September	11	7	6	24
October	20	12	6	38
November	30	6	12	48
December	43	9	17	69
Total	320	73	116	509
1959				
January	26	7	13	46
February	30	7	16	53
March	34	13	14	61
April	31	5	11	47
May	26	9	8	43
June	22	2	11	35
July	30	7	13	50
August	28	6	8	42
September	22	11	3	36
October	16	3	9	28
November	18	3	6	27
December	17	10	12	39
Total	300	83	124	507

tology is excluded, the department of pediatrics has the highest incidence, 42.55 infections on admission per 1000 patients; of departments with a significant admission rate the urology and E.N.T. departments are the lowest with less than one infection per 1000 patients. However, when care is considered as the number of patient days, general surgery has the highest rate of 19 infections per 10,000 patient days; also, using patient days, the rate of infections occurring after admission is one-half to two-thirds that present on admission. In neurosurgery, however, it is equal, and in urology the rate after admission is ten times greater than that on admission.

Temporal Incidence of Reported Infections

This has been summarized in Table II and Figs. 1, 2 and 3.

Fig. 1 shows a considerable variation in the number of infections reported each month. The reports received each month are subject to considerable fluctuation and seem to increase toward the end of 1958 but decline in 1959. These fluctuations, with the exception of the month of March 1958, seem to be caused almost entirely by changes in infections present on admission; the two curves follow one another closely. The exceptional number of postoperative infections in March 1958 all occurred in one wing of the hospital; there was no investigation of this situation because this part of the study was retrospective. It is interesting that the frequency of postoperative infections also paral-

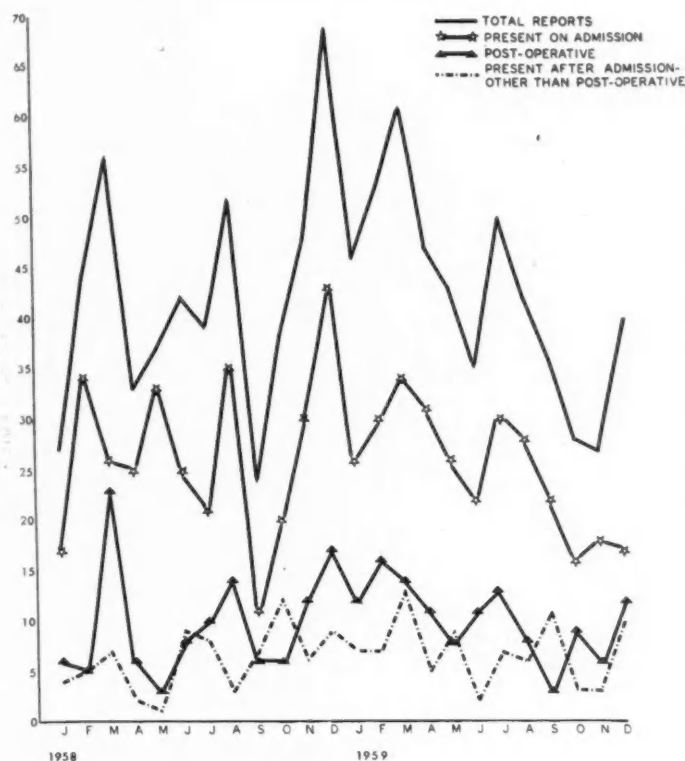


Fig. 1.—Number of infection reports received per month during 1958 and 1959 in the Winnipeg General Hospital.

lets the number of infections present on admission to hospital.

In order to discover trends in the occurrence of infections, we have plotted the reports received in the various categories as five-span moving averages. These are shown in Fig. 2. The total number of infections seems to rise towards the end of 1958 and the beginning of 1959 and fall towards the end of 1959. This is due to reports from patients admitted with infection, and again the number of postoperative infections increases at the same time;

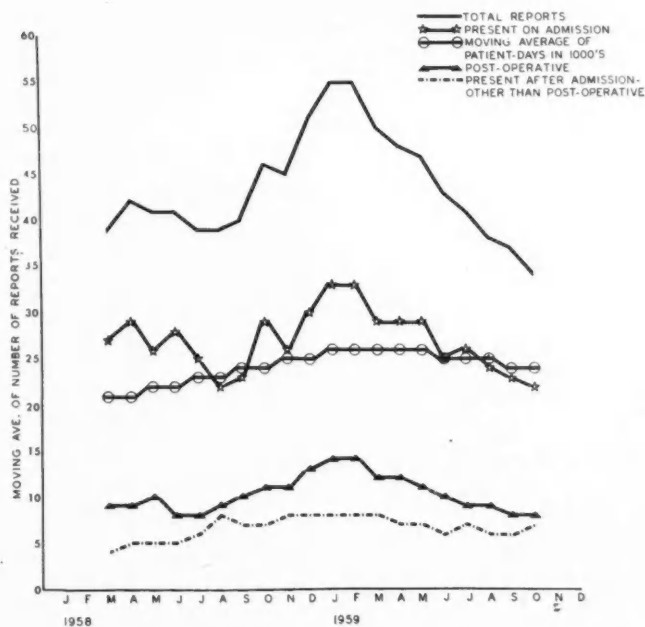


Fig. 2.—Five-span moving averages of infection reports received at the Winnipeg General Hospital and five-span moving average of the number of patient days care per month during 1958 and 1959.

the two curves follow each other closely. The number of infections acquired after admission, other than postoperative, show, if anything, a slight increase which parallels the trend of patient-days care, shown in the same figure.

The figures showing the monthly incidence are recorded for convenience in summarizing the data for publication; in practice the infections have been plotted weekly for each of the subdivisions of each area or service shown in Table I. Reference to these confirms the findings illustrated in Figs. 1 and 2.

So far we have dealt only with the number of infections reported; this assumes that the capacity of the hospital has not altered materially during the relevant period. The infection rate per 10,000 patient-days care and its moving average are shown in Fig. 3. There does not seem to be any marked trend up or down during the period of the investigation. This was confirmed by inspection of the figures showing the incidences and moving averages of infections reported under the various subdivisions of Table I.

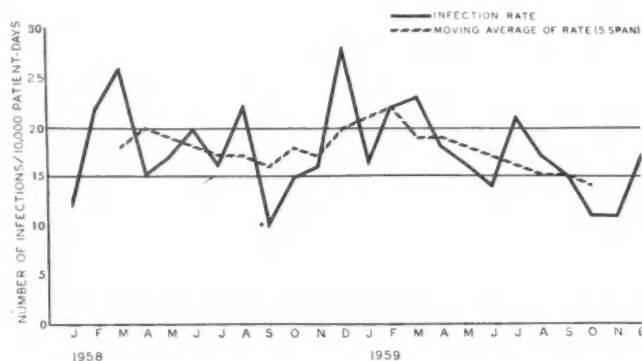


Fig. 3.—The number of infections per 10,000 patient days per month during 1958 and 1959 in the Winnipeg General Hospital and the five-span moving average of the rate.

Control Charts

The number of infections reported each week followed a Poisson distribution. Where there were sufficient observations to support this, it was tested for goodness-of-fit;¹³ otherwise there appeared to be no objection to the hypothesis and it was assumed to be true. On this basis, control charts similar to those used in industry were prepared. The average number of infections reported in 1958 and Molina's Tables¹⁴ were used and a number was chosen for each category which, on the average, would be expected to be exceeded in five per cent or fewer weeks. Then using the exact percentage, upper limits of the expected number of weeks in which the average would be exceeded, significant at the 99% level, were obtained from Snedecor's¹⁵ Table I and these were entered on charts,* for the 10th, 20th, 30th and 50th weeks for each one of the 11 subdivisions of sources of infection reports shown in Table I. Each week a point was entered opposite each subdivision, and its numerical value

*Codex Book Company's (Norwood, Mass., U.S.A.) one year by weeks x 100 divisions paper (No. 3262).

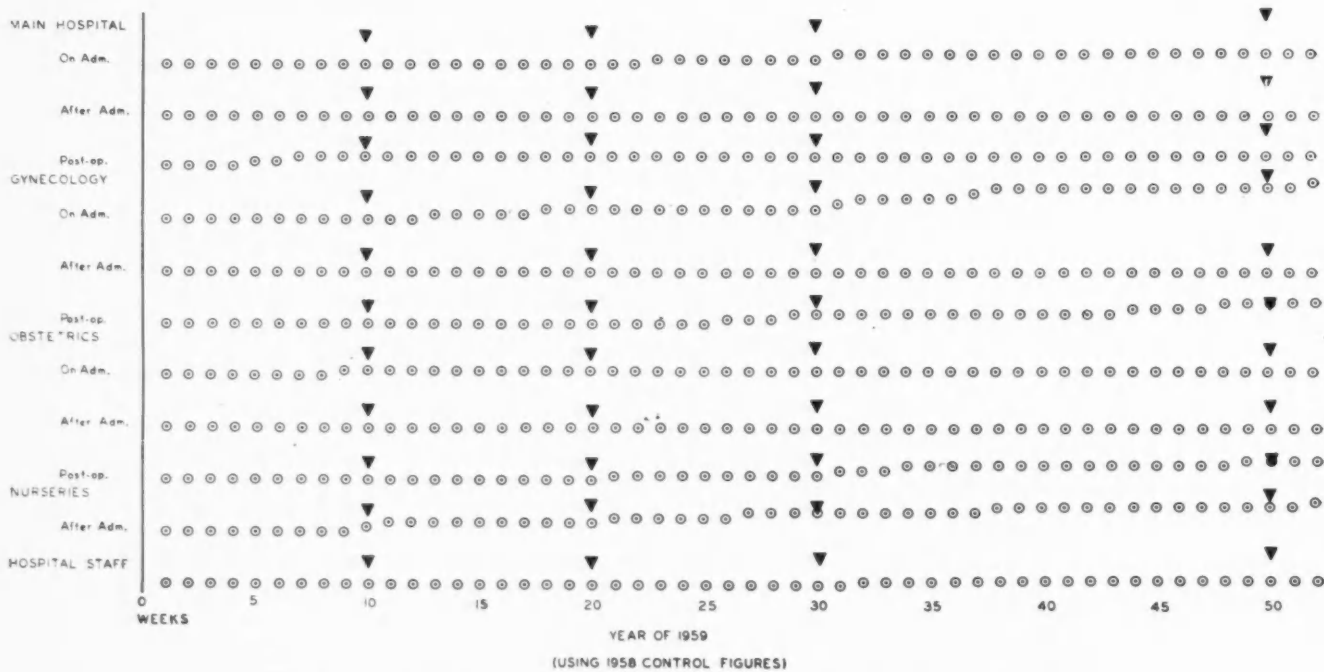


Fig. 4.—A control chart for the incidence of hospital infection in different departments based on the infection reports received in 1959 but with the control figures obtained from the average of 1958.

was obtained by subtracting the number of weeks in which the number of infections reported exceeded the appropriate given value from the number of weeks since the beginning of the year. One of the control charts is shown in Fig. 4. The purpose of preparing the control chart in this way was to have all the required information readily visible on one sheet of paper. In practice the chart indicated whether the number of infections reported during the period significantly exceeded the expected Poisson mean. If the plotted points remained below the warning levels, the expected average number of infection reports was not being exceeded; when the plotted point reached the warning levels, it meant that the expected average was being exceeded.

Naturally enough, since the values were calculated from 1958 data, infections in all categories appeared to be about average during 1958. The control chart (Fig. 4) with controls calculated from 1958 data showed rises in the average weekly return of infection reports at the end of 1959 in the gynecology department (on admission and post-operative), the obstetrics department (postoper-

ative) and in the nurseries. However, the numbers involved were small.

Random Sample of Staphylococcal Isolations

Of the 600 numbers drawn, nine were discarded owing to errors in selection, and the patients' records were not obtainable in 33. Of the 558 remaining, 83 were specimens which duplicated a source already represented and were discarded. In 74 instances the staphylococci were obtained from patients with no evidence of clinical infection; these were also discarded. The sample finally analyzed consisted of 401 isolations from patients with all types of infection; it was not restricted to lesions attributable to staphylococci because it was frequently impossible to decide whether staphylococci played a role in the production of the lesion noted.

The results are shown in Table III. In 228 instances the infection could certainly be attributed to the strain of staphylococcus isolated; the percentage of staphylococcal infections reported vary from 22% to 75%. There were 173 instances in which the connection between the staphylococcus

TABLE III.—DISTRIBUTION OF INFECTIONS REPORTED FROM RANDOM SAMPLE OF STAPHYLOCOCCAL ISOLATIONS

Type of bed	Staph. isolations sampled	Relation of Staph. to infection doubtful	Number reported	Staph. definitely related to infection	Number reported	Per cent reported
Main hospital—Medical	158	111 (84)*	1	47	13	28
Surgical	196	47 (28)	1	149	68	22
Gynecology	15	6 (0)	0	9	6	67
Obstetrics	12 *	8 (3)	0	4	3	75
Nursery	20	1 (0)	0	19	14	74
Total	401	173 (115)	2	228	104	46

*Figures in parentheses indicate number of sputa, bronchial washings and similar specimens from the upper respiratory tract, excluding throat swabs.

TABLE IV.—DISTRIBUTION OF INFECTIONS DEFINITELY ATTRIBUTABLE TO STAPHYLOCOCCI FROM RANDOM SAMPLE OF STAPHYLOCOCCAL ISOLATIONS

Section of hospital	Relation of infection to admission to hospital	Number in sample	Per cent of total infections	Estimated total for year	1959 infection reports
Main	Reason for admission	80	35	247	189
	Incidentally present	27	12	85	51
	After—postoperative	48	21	150	98
Gynecology	After—other	41	18	128	54
	Before admission	6	3	19	34
	After—postoperative	2	..	6	21
Obstetrics	After—other	1	..	3	4
	Before admission	2	..	6	26
	After—postoperative	1	..	3	5
Nursery	After—other	1	..	3	3
	After—other	19	8	59	22
Total		228		709	507

isolated and the infection described was not established. Two infection reports of this group were received. Both were for conditions clearly unrelated to the staphylococcus isolated. Most of the 115 cultures of staphylococci in this group, those of doubtful relation to the infection, were isolated from sputa or bronchial washings; it is interesting to note the frequency with which the organism is isolated when it is probably not playing a pathogenic role. However, all these patients were suffering from clinical infections but of 173 only two were accepted for reporting.

In 1959 the total number of staphylococcal isolations from the inpatient population from which our sample was drawn was 1747. Assuming the same proportion of isolations from infected patients in the total as obtained in the sample, we calculated that our isolations represented a total of 1255 infections among inpatients, or just about 3.13 times the number in our sample of 401.

Table IV shows the distribution of definite staphylococcal infections in the main divisions of infection. We have also inserted an estimated total for the year and compared these infections with all types of infection reported in the same categories. Except for gynecology and obstetrics, the expected number of staphylococcal infections is far in excess of the number of reports received. A consideration of the nurseries category reveals a weakness of this type of investigation in that Table IV shows the largest discrepancy between the expected number of staphylococcal infections and the number reported. Table III indicates the reverse situation, in that 74% of all definite staphylococcal infections were reported.

TYPES OF INFECTION REPORTED

(a) Main Hospital (excluding postoperative wound infection)

The incidence and distribution of infections reported during 1959 appear to be very similar to those of 1958 except that 40 patients suspected of having tuberculosis were reported in 1958 and only 20 in 1959. The two years have therefore been combined and are shown in Table V.

Of the total of 625 infections for the Main Hospital, 390 (62%) were reported as the reason for admission while in 21% the infection was incidentally present on admission, making a total of 83% of all patients admitted with infection.

TABLE V.—CLASSIFICATION OF DISEASES REPORTED IN INFECTED PATIENTS

Type of infectious disease	Reason for admission	Incidentally present on admission	Appeared after admission	Total
Tuberculosis	38 (10)*	22 (17)	0	60 (10)
Infestations	0	6 (5)	0	6 †
Other communicable diseases	33 (8)	12 (9)	9 (8)	54 (9)
Pyogenic infections	319 (82)	87 (67)	97 (92)	503 (80)
Unclassified	0	2	0	2 †
	390 (62)	129 (21)		
Total	519 (83)		106 (17)	625

* = Per cent of appropriate total.
† = About 1% or less.

(i) Tuberculosis.—During 1958, 44 reports were received stating that tuberculosis was suspected. Four of these were pyogenic infections and were therefore transferred to that group, leaving 40 classified as tuberculosis. Of these, 15 were bacteriologically proved, eight with pulmonary disease, one with pleural effusion, one with epididymitis and one with known miliary tuberculosis with respiratory failure as the reason for admission. Four more were proved by histopathological methods; in two the disease was in cervical nodes and in the other two in soft tissues. Of the remaining 25,

TABLE VI.—“COMMUNICABLE” DISEASES REPORTED

Type of disease	1958	Year 1959
Gonococcal	1	1
Tetanus	0	1
Erysipelas and impetigo	4	5
Meningitis	2	2
Diarrheal dis.	1	4
Conjunctivitis	1	0
Infectious hepatitis	6	7
Infectious mononucleosis	2	1
Exanthemata	6	3
Suspected poliomyelitis	4	0
Herpes stomatitis	1	0
Ringworm	0	2
Total	28	26

23 were suspected of having pulmonary tuberculosis or were known to have had this disease and their sputum was being examined for tubercle bacilli. Suspicious signs were detected incidentally in some of the patients admitted for other reasons, debilitating diseases or alcoholism. Of the remaining two, one had an ulcer and the other, disease of the spine; both were suspected of being tuberculous.

In 1959, pulmonary disease in seven patients and one ulcer of the skin in another patient were proved bacteriologically to be of tuberculous origin. Two patients with suspected tuberculous pulmonary disease had pyogenic infections and were transferred to that category. The remainder of the total of 20 consisted of patients with old or suspected pulmonary tuberculosis, sinuses or cervical lymphadenopathy. Some patients were diabetic; none were proved to have tuberculosis by bacteriological examination.

after admission. Of the five patients with diarrheal disease, one was proved to have typhoid and another a *Salmonella* infection; the others were not specifically diagnosed. Twelve patients were diagnosed as having infectious mononucleosis, chicken pox, measles or mumps. All of these diseases were almost certainly present on admission although some did not manifest themselves until afterwards. There were four patients in whom poliomyelitis was suspected and one of these was transferred to the infectious diseases hospital. The remainder were a miscellaneous group including one patient with ringworm in whom the disease did not appear until after admission.

(iv) *Pyogenic infections*.—Table V shows that the vast majority of infections reported were pyogenic, and these are shown in some detail in Table VII. Most of those infections (89%) which were the reason for admission consisted of breast abscesses, other abscesses, superficial infections and draining

TABLE VII.—CLASSIFICATION OF PYOGENIC DISEASES REPORTED IN INFECTED PATIENTS
1958 and 1959 combined

Type of pyogenic disease	Reason for admission	Incidentally present on admission	Appeared after admission	Total
Burns.....	6	7	4	17
Breast abscesses.....	35	0	0	35
Other abscesses.....	66	4	6	76
Superficial infections.....	75	35	66	176
Draining lesions.....	108	28	11	147
“Medical”.....	7	2	3	12
With diabetes.....	10	8	1	19
With vascular gangrene.....	6	2	2	10
Post-injection.....	1	1	4	6
Dental infection.....	3	0	0	3
Unclassified.....	2	0	0	2
TOTAL.....	319 (63)	87 (17)	97 (19)	503

* = Per cent of appropriate total.

(ii) *Infestations*.—Six patients with parasitic infestation were reported; these are included to show the complete range of conditions reported.

(iii) *Other communicable diseases*.—A total of 54 communicable diseases were reported in 1958 and 1959. There appears to be no precise definition of “communicable diseases” but we have taken them to be those listed in “Control of Communicable Diseases in Man” (8th ed.) published by the American Public Health Association. In 45 patients the disease was present on admission while in nine it appeared afterwards (Table V).

The different types of communicable disease reported are shown in Table VI. Infectious hepatitis is the commonest, a total of 13 patients being admitted with this condition in the two years. There is a high incidence of this disease in Manitoba and there has been for some time.

In 1958 one person with severe urethral discharge from presumed gonorrhea and in 1959 one with gonococcal arthritis were admitted. There was one patient with tetanus in 1959. Patients with the diagnosis of erysipelas and impetigo were frequently admitted. One patient contracted impetigo

lesions. Breast abscesses were, of course, associated with childbirth in one or other of the hospitals in the locality. Among “other abscesses” we included all abscesses or collections of pus which were not stated to be draining or to be a carbuncle, boil, pustule or cellulitis, these last four conditions constituting our “superficial infections”. The last category in this group were designated “draining lesions” and consisted of ulcers, infected wounds, sinuses, draining abscesses and so on; i.e. those lesions which might be considered particularly likely to distribute organisms to the environment. This last category is by far the largest and comprises over one-third of the group under discussion and all those infections that were the reason for admission. If we take all those patients admitted with pyogenic infections, one-third of them having draining lesions and one-quarter superficial infections, we have an obvious source of organisms in hospital.

The 12 so-called “medical” infections consisted of five patients with pneumonia, three (aged 71, 82 and 88) with parotitis, one patient with nasal discharge, one with empyema of the gallbladder,

one with Hodgkin's disease and streptococcal septi-
cemia, and finally, one patient with vaginal dis-
charge who was admitted for orthopedic surgery.

There were 17 patients with burns, four of whom
were infected after admission. The remainder is
a miscellany of patients with diabetes, vascular
gangrene and dental infection; this group also in-
cludes six patients in whom the infection either
certainly or probably followed hypodermic injec-
tion, from one of whom a pure growth of *Cl. welchii*
was obtained. Finally, there were two infec-
tions which we could not classify—one was
described as an infected mandible and the other
an infected traumatic puncture wound.

(v) *Postoperative infections.*—Postoperative
wound infections comprised about 18% of all in-
fections; of the 197 cases for which we have the
appropriate information over 75%, 150, developed
sepsis after the first change of dressing. This makes
it more likely that most infections were not con-
tracted in the operating rooms.

(b) *Gynecological Department*

Infections reported from the gynecological de-
partment are shown in Table VIII. Seventy-three
per cent of the infections were reasons for admis-
sion. These consisted of breast abscesses, Bartholin's
or vulvar abscesses and pelvic inflammatory disease
with or without vaginal discharge. There were also
three patients admitted with uncomplicated vaginal
discharge and one with a varicose ulcer. There were
six patients with boils ("superficial infections"),
two of whom contracted them after admission.
Incidentally present on admission were pneumonia
in one patient, infectious hepatitis in one patient,
a burn in one patient and head lice in another.
Two sore throats were reported in patients after
admission. In addition there were two instances of
abscesses occurring at the site of injection—the
infection being ascribed to it. Two others possibly
followed injection, one being described as an
abscess and the other as a "boil at the site of in-
jection".

(c) *Obstetrics Department*

A total of 68 infections was reported from the
obstetrics department during the two years of the
survey. In five, infection, two pneumonias and one
each of gastroenteritis, infectious hepatitis and
cellulitis, was the reason for admission. Most of
the remainder were incidentally present on ad-
mission; these included tuberculosis (three
patients), communicable diseases (nine patients),
and superficial infections (17 patients). Occurring
after admission were five superficial infections; two
were some form of puerperal sepsis and one was
thought to be scarlet fever but the diagnosis was
not confirmed.

(d) *Nurseries*

Out of a total of 34 infections during the two
years, 22 were described as pustules, five were

TABLE VIII.—INFECTIOUS DISEASE REPORTED FROM THE
GYNECOLOGICAL DEPARTMENT EXCLUDING
POSTOPERATIVE INFECTIONS

Reason for admission	Breast abscesses	11	43 (or 73%)
	Bartholin's or vulvar abscesses	11	
	Pelvic inflammatory disease	17	
	Vaginal discharge	3	
	Draining lesions	1	
	Superficial infections	6*	
	Medical	3*	
	Communicable disease and infestation	2	
	Burn	1	
	Possibly post-hypo. injection	4	
Incidentally present on admission			
Present after admission			
		59	

*Indicates that 2 of each total occurred after admission.

thrush and four were small septic areas on the
skin surface. Three patients had mild diarrhea and,
despite the mildness of the disease, one yielded an
enteropathogenic *E. coli*. The child was transferred
to the Children's Hospital and no outbreak ensued.

(e) *Hospital Staff*

Most infections reported were from student
nurses, but occasionally there was a report from
staff members other than student nurses. Of the
total of 97 infections reported, 71 were superficial
infections of the skin and 13 were communicable
diseases consisting of the exanthemata and in-
fectious hepatitis. There was one nurse with otitis
media, one with osteomyelitis, four with dental
infections and seven with abscesses.

*Comparison of Pyogenic Infections Reported with
Those in the Random Sample of Staphylococcal
Isolations*

Table IX shows two estimates of the efficiency
of reporting certain subdivisions of pyogenic in-
fections. The first estimate is obtained from the
staphylococcal random sample and noting the
number of them that were reported. The second
estimate is obtained by calculating the expected
number of staphylococcal infections in the whole
year and comparing the total number of infection
reports returned for the same categories of in-
fection, but by all types of organism. The second
estimate should be too high. The results suggest
that from about one-third to three-quarters of all in-
fections may be reported. However, it is obvious
that of all classes of infection the so-called "medi-
cal" ones are probably not being reported as often
as others. The reason may not be a failure to report
infections but a lack of awareness that the type of
infection was one that concerned us as recipients
of the reports.

Random Sample from Operating Lists

The total number of patients sampled from the
operating lists was 267. Of these, three were actually

TABLE IX.—DATA FROM SURVEY OF STAPHYLOCOCCAL INFECTIONS

Type of infection	Number of definite infections	Infection reports received	Per cent reported	Estimate for year	1959	
					Infection reports received	Per cent of staph. estimate reported
Breast abscesses	7	6	86	22	17	77
Other abscesses	16	6	38	50	36	72
Boils, carbuncles, etc.	43	24	56	135	89	66
Draining lesions	54	15	28	169	77	46
"Medical"	9	0	0	28	8	29

outpatients, 11 had their operations cancelled and the records of 33 (12%) were unobtainable, leaving a total of 220 patients' records examined. The results are shown in Table X. There are 10 wound infections out of 220 sampled or a rate of 4.5%, which is more in keeping with the experience of most other hospitals^{2, 9, 16, 17} than with the return of infection reports, which would indicate an incidence of less than 2% inclusive of medical conditions such as pneumonia and pyelitis.

TABLE X.—ANALYSIS OF RANDOM SAMPLE FROM OPERATING LIST

	Postoperative			Un-infected	Total
	Wound	Medical	Others		
Total infections	10	4	11	195	220
Infection reports received	4	0	2	0	6
Bacteriology done	5	3	6	—	—
Staph. isolated	4	2	1	—	—
Antibiotics	7	4	8	62	81
Pyrexia—100-101° F.	4	2	1	60	67
Over 101° F.	3	2	3	34	44

About one-quarter of all the infections had been reported and four out of 10 of the wound infections. Bacteriological study was carried out in slightly over one-half of the infections, and six out of the eight postoperative infections yielded *Staph. pyogenes* in contrast to one out of the six other infections which were conditions for which the patients were admitted. Four out of five wound infections yielded *Staph. pyogenes*, and two of the three "medical" postoperative infections also yielded staphylococci.

Antibiotics were administered in more than three-quarters of the infections and in over one-third of

those patients in whom no evidence of infection was noted in their records. However, the numbers involved are small and may be subject to considerable error.

A temperature of between 100° and 101° F. was recorded in about one-third of all patients regardless of the presence of infection, and one-third or more of those with infections also had temperatures greater than 101° F. However, it is important to note that 18% of patients in whom no infection was recorded had temperatures greater than 101° F.

Table XIa shows the incidence of infection according to the type of surgery performed. Most of the numbers involved are too small to be of much significance but there is an indication that amputations, abdominal operations and chest and arterial operations have a high incidence of infection. This was expected and is confirmed in Table XIa, comprising the data obtained from infection reports. A comparison of the proportion of the different types of operation sampled, with the total numbers of each type recorded for the year (Table XI), indicates random selection with no significant departure from expectation

($\chi^2_{[8]} = 11.8, P = 0.11$).

Table XII shows that the average time spent in hospital by patients with postoperative infection is approximately 10 days in excess of other infections and those not infected. From our figures we may estimate that there are nearly 300 patients with postoperative infection per year, which means 3000 excess days of hospital care or, at \$20.00 per day, \$60,000 per annum for postoperative infections only. It may be objected that these people

TABLE XI.—DISTRIBUTION OF INFECTIONS ACCORDING TO TYPE OF SURGERY PERFORMED
From Random Sample obtained from Operating List

Type of surgery	Postoperative	Other	Not infected	Per cent postoperative infections	Total operations performed in 1959
Neurosurgery	1	1	27	3	873
Head and neck	0	2	11	—	325
Curettage	0	1	15	—	278
Amputations	3	0	3	50	185
Chest and arterial	1	0	8	11	230
Abdominal	7	2	47	13	1561
Gynecologic	0	1	5	—	317
Orthopedic	0	3	46	—	1528
Miscellaneous	2	1	33	6	1266
TOTAL	14	11	195		6563

N.B.—Urology, eye, ear, nose and throat have not been included.

TABLE XIa.—DISTRIBUTION OF POSTOPERATIVE INFECTIONS AS INDICATED BY INFECTION REPORTS

Type of surgery	Wound infections reported			Number of operations performed			Per cent infections
	1958	1959	Total	1958	1959	Total	
Neurosurgery.....	2	6	8	640	873	1513†	0.52
Head and neck.....	4	1	5	327	325	652	0.77
Curettage.....	0	0	0	184	278	462	0.00
Amputations.....	14	6	20	173	185	358	5.59
Chest and arterial.....	3	5	8	171	230	401	2.00
Abdominal.....	54	43	97	1382	1561	2943	3.30
Gynecologic*.....	1	9	10	185	317	502	1.99
Orthopedic.....	19	16	35	1385	1528	2913	1.20
Miscellaneous.....	7	4	11	1286	1266	2552	0.43
Urology.....	4	14	18	1705	1894	3599	0.50
TOTAL.....	108	104	212	7438	8457	5895	1.33

*Operations done in Main Hospital only.

†Over 60% of these are ventriculograms, encephalograms and angiograms.

contract infections because they stay so long in hospital. This seems unlikely, but even if we allow for this circumstance by calculating that our estimated total of staphylococcal infections is 75% of all infections, we obtain an average figure of 61.7 infections per 10,000 patient days, which implies

TABLE XII.—AVERAGE NUMBER OF DAYS SPENT IN HOSPITAL BY INFECTED AND UNINFECTED PATIENTS IN THE RANDOM SAMPLE OBTAINED FROM THE OPERATING LIST

Type of operation	Infected patients		Patients not infected
	Postoperative	Other	
Neurosurgery	99.00 (1)*	9.00 (1)	22.15 (27)
Head and neck	—	3.00 (2)	11.45 (11)
Curettage	—	11.00 (1)	6.13 (15)
Amputations	20.33 (3)	—	7.67 (3)
Chest and arterial	15.00 (1)	—	21.25 (8)
Abdominal	24.00 (7)	22.50 (2)	17.68 (47)
Gynecologic	—	17.00 (1)	10.00 (5)
Orthopedic	—	25.33 (3)	20.87 (46)
Miscellaneous	17.50 (2)	27.00 (1)	8.27 (33)
Average	27.00	17.36	16.01

*The number of patients is shown in parentheses.

that fewer than 20 of our 300 patients would contract infection by chance, and thus our total would be reduced by only \$4000.

The numbers involved are, of course, small and subject to error, but they indicate the order of cost of infections.

Table XIII shows the age distribution of the samples. The main feature of interest is that the average age of those whose infection was the cause of admission is about 44 years, while those whose infection was incidentally present on admission or contracted after admission (other than postopera-

TABLE XIIIa.—AVERAGE AGE OF PATIENTS OF DIFFERENT CLASSES IN HOSPITAL

	Mean	S.E.	Number
Sample from operating list	45.13	1.17	220
Patients discharged from surgery (except urology)	47.18	1.93	4176
Patients discharged from urology	62.17	0.76	492
Patients discharged from eye service	58.71	1.26	318
Patients discharged from E.N.T.	41.23	1.11	340
Patients discharged from medicine and psychiatry	57.35	1.08	2598
Patients with infections reported from obstetrics	27.63	2.80	57
Patients with infections reported from gynecology	38.45	1.51	84
Patients discharged from gynecology	41.08	0.46	993

tive infections) was about 50 years, and the average age of those suffering postoperative infections appears to be about 58 years. Thus it appears that on the average the older patients suffer from postoperative infections more than the younger.

TABLE XIII.—AGE DISTRIBUTION OF INFECTED PATIENTS

Source of data	Classification of infection													
	Reason for admission			Incidentally present on admission			After admission other than postoperative			Postoperative			Combined values	
	No.	Mean	S.E.†	No.	Mean	S.E.	No.	Mean	S.E.	No.	Mean	S.E.	No.	Mean
Infection reports.....	381	44.11	2.13	127	49.91		106	49.62	4.57	202	58.02	2.52	916	49.17
Staph. sample.....	80	45.63	2.34	27	54.63		41	52.56	3.42	48	60.83	2.47	196	52.04
Operating list sample—														
Postoperative site.....										10	58.00	3.96		
Other than postoperative..	11	41.36	4.25											
“Medical” postoperative..										(4	52.50	2.50)*		
COMBINED VALUES.....	472	44.30		154	50.74		147	50.44		260	58.53		1033	49.72
Total: 301, Mean: 50.59														

*These figures not included in combined averages.

†S.E. = Standard error.

TABLE XIIIb.—SEX DISTRIBUTION OF PATIENTS IN SURVEY

Year	Department	Patients reported to have infectious disease		Patients in sample from staph. isolations		Patients in sample from operating list	
		Female	Total	Male	Female	Total	Male
1958	Gynecology.....	28					
	Obstetrics.....	31					
	Main hospital.....	172	231	266			
1959	Gynecology.....	59			15		
	Obstetrics.....	34			12		
	Main hospital.....	164	257	228	142	169	212
							117
							103

Table XIIIa shows a comparison of the average ages of different groups of patients within the hospital. These figures were obtained from data grouped in decades. The average age of the patients discharged was obtained from data supplied by the records department. It is seen that the average age of our sample from the operating list is the same as that of a comparable sample discharged from the surgical service. Patients discharged from urology and the eye departments are on the average older than those from other surgical departments while those discharged from E.N.T. are younger. Patients discharged from medicine and psychiatric departments are 57 years of age on the average. Patients with infections in the obstetrics and gynecology departments seem to be in the expected age groups. Patients in the obstetrics department with infections are on the average nearly 28 years of age. We were not able to obtain figures to calculate the average age of women discharged from the obstetrics department, but a comparison of the average ages of infected patients and those discharged from the gynecology department show no significant difference.

Table XIIIb shows the sex distribution of the patients in the three samples. Apart from a preponderance of males in the random sample of staphylococcal isolations and a preponderance of females in the random sample from the operating list, the sexes seem to be distributed more or less evenly.

Table XIV shows the results of bacteriological investigations in the pyogenic infections and the postoperative wound infections combined for the two years 1958 and 1959 in patients whose infections were reported. The two years were very similar and, therefore, have been combined.

The main points of interest are that staphylococci were isolated from over 70% of all specimens from pyogenic infections, either alone in most cases or in combination with other organisms in about one-fifth of all patients. Beta-hemolytic streptococci do occur, although rarely. Infection with Gram-negative organisms is far more common in the postoperative wound infections, half of which are infected by Gram-negative organisms and half with staphylococci. No bacteriological study was carried

TABLE XIV.—ORGANISMS ISOLATED FROM PATIENTS WITH REPORTED INFECTIONS
Main Hospital

Organism	Accompanying organisms	Pyogenic* infections	Postoperative wound infections
Staphylococcus	None.....	215 (55)	60 (34)
	Gram-negative.....	43 (11)	32 (18)
	Strep.....	15 (4)	1
	Gram-negative and strep.....	4	1
	Others.....	7 (2)	6 (3)
Gram-negative	None.....	36 (9)	52 (29)
	Strep.....	1	0
	Others.....	9 (2)	12 (7)
Strep.	None.....	16 (4)	2
	Others.....	1	1
Other pathogens.....		14 (4)	3
Saprophytes.....		17 (4)	6 (3)
No organisms.....		14 (4)	3
TOTAL SPECIMENS SUBMITTED.....		392	179
No bacteriology.....		111 (22)*	23 (11)*
TOTAL INFECTIONS REPORTED.....		503	202
Total specimens with staphylococcus.....		284 (72)	100 (56)
" " " Gram-negative.....		93 (24)	97 (54)
" " " strep.....		36 (9)	4 (2)
" " " <i>Proteus</i> sp.....		26 (7)	25 (14)
" " " <i>Ps. pyocyanea</i>		20 (5)	29 (16)
" " " <i>Bact. aerogenes</i>		22 (6)	25 (30)

*Figures in parentheses represent per cent recovery from specimens submitted except where there is an asterisk when it represents per cent of infection reports submitted.
N.B.—The abbreviation "Strep." means β hemolytic streptococci; and "Staphylococcus", coagulase-positive staphylococci.

TABLE XV.—BACTERIOLOGICAL INVESTIGATIONS OF SPECIMENS FROM PATIENTS WITH REPORTED INFECTIOUS DISEASE IN NURSERY, OBSTETRIC AND GYNECOLOGICAL DEPARTMENTS EXCLUDING POSTOPERATIVE INFECTIONS

	Departments		
	Nursery	Obstetrics	Gynecology
Staphylococci.....	23 (73)*	14 (44)	23 (35)
Thrush.....	3 (10)	0	0
Other organisms.....	2	11 (34)	22 (35)
Non-pathogens.....	3	6	15
No organisms.....	0	1	5
No bacteriology.....	4	19	19
Total infection reports	34	51	84
Per cent of reported infections with bacteriological investigation.....	88	63	76

*Figures in parentheses are percentages of specimens examined bacteriologically within each department.

out in 20% of pyogenic infections, and in just over 10% of postoperative wound infections.

Of these specimens containing Gram-negative organisms the distribution of *Proteus*, *Ps. aeruginosa* and *B. aerogenes* appeared to be equal and is similar for both pyogenic and postoperative infections, although, of course, they are more numerous in the postoperative infections.

TABLE XVI.—ANTIBACTERIAL THERAPEUTIC AGENTS ADMINISTERED TO PATIENTS IN THE RANDOM SAMPLE OF STAPHYLOCOCCAL INFECTIONS

Type of infection	Patients			Erythro- mycin	Chloram- phenicol	Tetra- cycline	Sulfona- mide	S.R.D.*	Strep. group	Other
	Total	Treated	Penicillin							
Pyogenic—										
Burns.....	5	5	0	3	0	2	0	4	1	1
Breast abscess.....	7	4	1	1	1	0	0	2	0	0
Other abscess.....	16	15	2	3	4	0	0	5	0	2
Superficial.....	43	36	15	10	13	8	4	8	1	4
Draining.....	54	48	22	13	17	10	5	11	4	3
“Medical”.....	158	131	83	21	47	26	11	15	25	17
In diabetic.....	15	15	6	6	2	0	1	3	1	5
Postoperative.....	54	52	14	12	22	11	5	15	7	21
Gynecological.....	15	14	3	1	0	0	2	3	0	3
Obstetrical.....	12	10	5	0	3	1	1	2	1	1
Nursery.....	20	5	3	0	1	0	0	0	6	0
TOTAL.....	399	335	154	70	110	58	29	68	46	57

*Slow-release penicillin in a fixed combination with dihydrostreptomycin.
N.B.—Two unclassifiable patients were omitted from this table.

Table XV shows the distribution of organisms in the nurseries, obstetrics department and gynecological department. In the nurseries there is an obvious predominance of staphylococci, which constitute over 70% of all organisms isolated, whereas staphylococci were obtained from less than half of the specimens submitted from the obstetrics department. It should be noticed that in the obstetrics department specimens yielded other organisms very nearly as frequently as staphylococci. The same situation held in the gynecological department, where about 35% of all specimens submitted yielded staphylococci and an equal number yielded other types of organisms. Fewer bacteriological investigations were carried out in obstetrics and gynecology than in the nurseries; this is largely because of the types of infection in the different departments.

Antibacterial Agents Used in Treatment

In view of the reputed relationship of the increased use of antibiotics to hospital infection, particularly with staphylococci, information was collected concerning antibacterial agents administered to the patients selected in the random sample from staphylococcal isolations. The results are shown in Table XVI. Of 399 patients on whom we had sufficient information, 335 or 84% received antibacterial agents. Penicillin was administered to 39% and was the most commonly used antibiotic, being followed by chloramphenicol, which was given to 28% of patients. Erythromycin and a penicillin-dihydrostreptomycin mixture (S.R.D.) were the next most frequently administered preparations (17%). Surprisingly, the tetracyclines were fifth in order of frequency and then the streptomycin group (streptomycin, kanamycin and neomycin but excluding dihydrostreptomycin), followed by the sulfonamides. Miscellaneous antibacterial agents (Table XVII) were given to about 13% of patients.

More than one antibacterial agent was administered to 64% of the 291 patients on whom sufficient information is available. As many as 9%

had five or more antibacterial agents, and 26% were given more than one drug in the form of proprietary combinations. We have no information on whether these antibacterial agents were given together or separately, nor do we know whether

TABLE XVII.—DETAILS OF ANTIBACTERIAL AGENTS CLASSIFIED AS “OTHER” IN TABLE XVI

Antibiotic	Number of patients
Mycostatin.....	1
Mycostatin-tetracycline combination.....	7
Methenamine mandelate.....	10
Nitrofurantoin.....	12
Novobiocin.....	18
Oleandomycin-tetracycline combination.....	4
Spiramycin.....	2
Penicillin-streptomycin combination.....	3
Total.....	57

TABLE XVIII.—NUMBER OF PATIENTS FROM RANDOM SAMPLE OF STAPHYLOCOCCAL ISOLATIONS GIVEN ONE OR MORE ANTIBIOTICS

Type of infection	Number of antibiotics administered to each patient									No. of patients given combination	Details not known	Total patients treated
	1	2	3	4	5	6	7	8	9			
Pyogenic—												
Burns.....	1	1		2	1					4		5
Breast abscess.....	2	1								2		4
Other abscess.....	4	7	1							5	3	15
Superficial.....	12	13	4	2	1			1		8	3	36
Draining.....	17	14	5	6		2				11	4	48
“Medical”.....	44	31	17	13	8	1	1			18	16	131
In diabetic.....	7	2	4	1						3	1	15
Postoperative.....	9	5	10	7	8				1	17	12	52
Gynecological.....	2	8								6	4	14
Obstetrical.....	5	4		1						3		10
Nursery.....	1	2			1						1	5
TOTAL.....	104	88	42	32	19	3	1	1	1	77	44	335

they were used for the staphylococci isolated; also some of them may have been used topically.

All staphylococci about which we obtained information concerning antibiotic sensitivity were sensitive to one or other of the available systemic antibiotic agents. Table XIX shows that 243 out of 313 (78%) were also sensitive to one or more of the antibiotic agents used, whereas 29 (9%) were resistant to all agents used and 41 (13%) to the only one used. Since it is not known whether the antibiotics were directed specifically against staphylococci, the last two results are not surprising.

Table XX shows the weight of systemic antibacterial agents purchased during 1959. This confirms the heavy usage of penicillin and chloramphenicol, although the amount of sulfonamides purchased equals that of penicillin.

Table XXI is an attempt to see whether antibiotics administered before operation increased the number of postoperative infections. No effect is seen, but the numbers are so small that they would be capable only of detecting an effect far greater than is known to occur.

TABLE XIX.—SENSITIVITY OF STRAINS OF STAPHYLOCOCCI TO THE ANTIBACTERIAL AGENTS USED

Type of infection	Strains of staphylococci					Total
	Resistant to The only agent used	All agents used	Sensitive to one or more agents used	Not tested	Not known	
Pyogenic—						
Burns.....			5			5
Breast abscess.....		2	2			4
Other abscess.....	2	1	12			15
Superficial.....	6	2	28			36
Draining.....	6	2	40			48
“Medical”.....	19	13	81	2	16	131
In diabetic.....	1	2	11	1		15
Postoperative.....	4	4	43		1	52
Gynecological.....		3	9	2		14
Obstetrical.....	3		7			10
Nursery.....			5			5
TOTAL.....	41	29	243	5	17	335

TABLE XX.—SYSTEMIC ANTIBACTERIAL AGENTS PURCHASED 1959

Class of antibacterial agent	Weight in kg. In	
	Alone	combination
Sulfonamides.....	24.25	0.2
Penicillin.....	24.00	1.63
Chloramphenicol.....	11.95	
Tetracyclines.....	9.24	2.24
Erythromycin.....	4.75	
Neomycin.....	2.61	
Streptomycin.....	2.46	0.48
Kanamycin.....	1.77	
Novobiocin.....	1.78	
Dihydrostreptomycin.....		1.10

For all of the other antibacterial agents the quantities were less than 1 kg., except for methenamine mandelate and nitrofurantoin which have not been included.

DISCUSSION

Our experience during the survey period of 1958, 1959 and subsequently has shown that the method of reporting infections described does not take an excessive amount of time, but only a minimum

TABLE XXI.—RELATIONSHIP OF ANTIBIOTIC TREATMENT TO OPERATION

Class of patient	Relation of antibiotic treatment to operation				Total
	No antibiotics	Before	Before and after	After	
Uninfected.....	132	5	14	44	195
Infected on admission....	3	2	3	3	11
Postoperative infection....	3	0	1	10	14
Total.....	138	7	18	57	220

amount of information is available immediately while the remainder has to be extracted from the patient's record at a considerably later date. The method has one obvious defect: it does not give a measure of the total number of infected patients in hospital on any one day. This defect has since been remedied in the Winnipeg General Hospital by obtaining a daily report of the infected patients in addition to the infection report described in this paper. The daily report is simply a list of patients, and a single letter opposite each name which denotes one of the five following conditions:

- A. Infection still present
- C. Cured
- D. Discharged or transferred
- I. Isolation (i.e. the patient has been isolated)
- N. New infection

This takes very little time and has been accepted by the nursing department in their daily routine. The method now enables us to gauge the amount of infection in the hospital in the preceding 24 hours.

As far as the reporting of infections is concerned, it is obvious that the variation in interpretation by the individual of what should be reported leads to highly variable results. Although efforts had been made to publicize the view that all infections should be reported in our survey, it is obvious from our results that not even all the infections thought worthy of mention in the patients' records are being reported. In this connection different departments have different problems in connection with infection and this results in different requirements for reporting and prevention. It is plain too, from our survey, that the categories of infection listed on our infection report form do not allow for the easy insertion of certain kinds of infection. People also vary in their definition of "infection", "sepsis", and "communicable disease". As indicated above and pointed out by others,^{2,9} not all instances of sepsis are found in the patient's record.

In certain instances, suspected infections such as tuberculosis were reported and subsequently found to be due to other causes. Such a situation is inevitable, but precautions must be taken to reclassify the reported infection in subsequent analysis.

However, if these difficulties are kept in mind, and with the improvement of daily reporting, the system is economical in time. It is also flexible because when patients' records are obtained, the type and scope of additional information requested may be varied from time to time to allow the investigation of different aspects of the problem of hospital infection.

To arrive at a preliminary assessment we have assumed that the number of infections reported is approximately proportional to those actually occurring. From our results, two to three times as many infections were reported present on admission as occurred after admission, indicating that the bulk of infection in hospital occurs in patients

who are admitted with it. This is the reverse of what was found for staphylococcal infections only in Kings County Hospital, Washington,¹⁸ and the Hospital of the University of Pennsylvania.⁷ In our own staphylococcal survey the numbers of patients admitted with infection and those who contracted it after admission were about equal. Figs. 1 and 2 also indicate that the number of postoperative infections rises and falls with the number of patients admitted with infections. This suggests that whatever other factors may be important, the total number of patients in a hospital with infection affects the incidence of postoperative sepsis. This suggests that the careful segregation of uninfected surgical patients might reduce the incidence of infection among them. Fig. 2 also shows that those infections reported as occurring after admission, other than postoperative infections, appear to follow the trend of an increasing number of days of patient care.

The infection rate when estimated per 10,000 patient days per year did not differ significantly in 1958 or 1959 and did not rise significantly in 1960. It is possible that the efficiency of reporting was not great enough to detect significant variations in the number of infections. In the gynecological department the control chart showed an increase in number of patients admitted with infection and patients with postoperative sepsis; postoperative sepsis increased in the obstetrics department and sepsis also increased in the nurseries. All these changes are seen to occur at the end of the year in the control chart (Fig. 4) and are presumably overshadowed by the overall average because the numbers in those groups that had an increase were small. Tables III, IV and IX give some indication of the efficiency of reporting. The random sample of staphylococcal isolations indicates that the total number of staphylococcal infections in 1959 was at least 709, whereas only 507 infections of all types were reported; the maximum efficiency of reporting was 71% by this method of estimation. Other estimates based on reasonable numbers shown in the tables vary from 22% to 77%. The numbers in the random sample from the operating list are too small for a reliable estimate of efficiency, but the trend is the same as in the random sample of staphylococcal isolations.

An analysis of the diseases recorded on infection reports reveals certain points of interest. Suspected tuberculosis appears to be common. Of the 60 patients reported, 23 were bacteriologically proved to have the disease, while 15 of these were producing the organism in their sputum and were potentially highly infectious. In this experience, at least 25% of all patients in whom a report of suspected tuberculosis is made are potentially dangerous.

There was a fairly wide variety of communicable diseases reported; no outbreaks resulted but it seems a possibility that such diseases as infectious

hepatitis are transmitted to the staff, particularly to student nurses.

The bulk of infections reported consist of pyogenic infections, and of these nearly two-thirds consist of superficial infections, boils, pustules, carbuncles, cellulitis, etc., and draining lesions, ulcers, sinuses, etc. In other words, most of the pyogenic infections are lesions which provide adequate opportunity for the spread of organisms and most of such infections are admitted to hospital.

Breast abscesses are entered in a separate category because the organisms responsible for these lesions are almost invariably obtained in a maternity unit and are an indication of sepsis contracted in hospital.

Another type of infection which requires special comment is that related to a hypodermic injection. We may have overestimated these, but every case in which there could have been such an occurrence should be scrutinized carefully. This is particularly important in view of reports of tetanus following the subcutaneous inoculation of adrenaline.¹⁹

The analysis of types of infectious disease from the gynecological department suggests that some allowance should be made on the infection report form for "pelvic inflammatory disease" and for Bartholin's or vulvar abscesses which, apart from breast abscesses, are two of the most commonly reported diseases.

Another point of interest in connection with the types of infectious disease in hospital is that in the random sample obtained from staphylococcal isolations, in a large number of whom the relationship of the staphylococcus to the disease was doubtful, the organism was isolated from sputa (Table III). In these instances, although the organism may not have had a causal relation to the disease, its presence in sputum, its spread during expectoration and the explosive nature of coughing would be expected to contribute materially to the widespread dissemination of staphylococci. The types of disease encountered by us appear to be in general similar to those observed in the only other survey of a similar kind made by Goodall⁵ in 1952 in British hospitals, for all types of hospital infection. His findings differed in that they included more respiratory disease and pneumonia, which go towards confirming our suspicion that such diseases were not being reported in our study.

The random sample from the operating list is too small to be very useful but it does indicate that not all infections are being reported; it indicates a postoperative infection rate of about 4.5% which is far greater than that indicated by the return of infection reports, 1.3%. The postoperative rate is less than any of those reviewed by Williams *et al.*² from recorded outbreaks which ranged from about 7% to about 29%. However, both figures fall within the range quoted from the results of surveys

of non-epidemic sepsis reviewed by the same authors; these ranged from 1.2% to about 41% (apart from 2 out of the 19 surveys quoted, the upper limit of this range is about 14%). All that can be said is that the incidence of postoperative infection shown here is of the same order as that reported elsewhere. There is a suspicion that the incidence of postoperative infection is proportional to the intensity of the search for it and the criteria of infection. Methods for the definition of these two properties in surveys would go far to elucidating the subject, as Walker²⁰ points out.

As accurate a comparison as possible was made of the incidence of infection in different categories of operation (Table XIa) with similar results obtained by the Public Health Laboratory Service and shows a very much lower incidence in each category. This was expected because their average was 9.4% as compared with ours of 1.3%. However, in both there is a high incidence of abdominal operations, which also agrees with Farrer and MacLeod.⁷

Regarding the cost of hospital infection, our estimate of about \$55,000 per year for postoperative infections alone is probably an underestimate, especially since we have excluded certain categories of operation. Figures obtained from Britain² suggest that the actual figure is two to three times greater. Farrer and MacLeod⁷ in a hospital of 800 to 900 beds indicate an excess stay of 24.4 days for 252 patients with hospital-acquired infection. This would be an excess expenditure of \$123,000 per annum at \$20.00 per day. This takes no account of the additional pain, discomfort and danger for the patient or of the infections contracted after leaving hospital. The above calculations indicate where saving in medical care can be made.

Farrer and MacLeod⁷ found that most patients with hospital-acquired infection were in the sixth decade, and they stated that 60% of the infections were postoperative. The average age of our patients developing postoperative sepsis was about 58, while those contracting sepsis after admission, other than postoperative, were just over 50 years of age. Farrer and MacLeod also showed that after the first year the attack rate in each decade increased with age and our figures do not contradict this.

The species of organism most commonly isolated was *Staph. pyogenes* (i.e. coagulase-positive staphylococcus), although its incidence in postoperative wounds was less than in other types of infection. There was a higher proportion, nearly as great as that of staphylococci, of Gram-negative organisms in the postoperative wounds than in other infections, which accounts for the difference. Group A β -hemolytic streptococci were occasionally isolated, but their presence seemed to be of little epidemiological significance. It is interesting to note that in from 10% to 20% of reported infections no bacteriological examination was car-

ried out; some of such infections were presumably in inaccessible sites.

The investigation of antibiotic usage was incorporated in this study as an example of one of the many aspects of hospital infection that can be investigated in this way; it is not necessarily considered to be a more important facet than any other. In Table XVI it must be remembered that the patients were selected because staphylococci had been isolated from them and this is presumably the reason why so large a proportion (28%) received chloramphenicol, although Table XX shows that, next to the sulfonamides and penicillin, more chloramphenicol was purchased than any other antibiotic in 1959. Another point of interest, in view of its sinister reputation for causing deafness, is that dihydrostreptomycin was given to 17% of patients treated with antibacterial agents. Also it is interesting to note that nearly two-thirds of patients treated with antibiotics received two or more of these drugs, and more than one-third received three or more antibiotics, one patient receiving as many as nine.

It is encouraging to find that none of the strains of staphylococci we encountered were resistant to all the available antibiotics, though they may have been resistant to all antibiotics used (Table XIX). However, we do not know from our data whether the antibacterial agent was being used to combat the staphylococcus or whether it was being administered for some other reason.

Our general conclusion is that, although the described method of surveying hospital infection may not be highly efficient at present and may even seriously distort the picture, provided we bear this in mind, it is instructive; and there is no reason why, in time, it should not become highly efficient and present an accurate picture of the epidemiological situation. One thing is quite certain: unless the method is tried, we shall never know whether it will be successful or not. The trial has shown one thing definitely: that it is not so complex and time-consuming as to make it impractical to apply in a general hospital of the size and nature of the one from which this report comes.

SUMMARY

From information obtained from patients' records, an analysis of 1113 infections reported in 1958 and 1959 in the Winnipeg General Hospital (about 800 beds) revealed that the number of patients with infections when they were admitted to the hospital was greater than the number of those who acquired infection after admission. The overall incidence of infections did not appear to change significantly during the survey period although in some departments there may have been an increase.

The incidence of postoperative sepsis appeared to parallel the incidence of infection in patients admitted to the hospital, whereas the incidence of infection, other than postoperative, acquired in the hospital, appeared to parallel the number of patient-days care provided.

In order to test the efficiency of infection reporting, random samples of patients were obtained from the register of staphylococcal isolations and from the operating lists. These revealed a number of interesting features and showed that not even all those infections mentioned in patients' records were reported. The proportion of infections being reported appeared to vary from about 20% to about 80%. It seemed that respiratory infections, particularly pneumonia, were not being reported although sputa from such cases often contained staphylococci.

Most infections reported appeared to be superficial pyogenic infections of the kind that could be responsible for the wide dissemination of bacteria. A surprisingly large number of patients with tuberculosis were admitted to the hospital. Infection following subcutaneous injection occurred on a few occasions.

The excess length of time spent in hospital by patients acquiring infection there was shown to cost amounts of money of the order of tens of thousands of dollars per year, thus providing a great opportunity for saving and the justification of expenditure on the investigation of hospital infection.

The average age of infected patients appeared to be higher than that for all patients in the same category.

Bacteriological examination was not carried out in from 10% to 20% of infections, perhaps owing to their inaccessibility. The organisms isolated were predominantly coagulase-positive staphylococci and Gram-negative bacilli although Group A β -hemolytic streptococci were not unknown.

A survey of antibiotics used in those patients from whom staphylococci were isolated and those patients on the operating list showed that many patients with no mention of infection in their record received antibiotics, possibly for preoperative prophylaxis. Those receiving antibiotics were more likely to have two or more antibiotics than they were to have a single one. Chloramphenicol was the second most commonly used antibiotic and, if we exclude sulfonamides, the weight of this drug purchased in 1959 was second only to penicillin. In the sample studied, 20% of patients received dihydrostreptomycin in a commercially prepared fixed combination.

Our conclusion is that our technique of infection reporting (now improved) is a useful and practical one which could increase in efficiency with time. The method can be used to probe different aspects of hospital infection from time to time. It should therefore be continued despite the occasional depreciation of such methods as useless.

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MANAGEMENT OF PROLONGED RETENTION OF THE DEAD FETUS IN UTERO*

R. A. H. KINCH, M.D., F.R.C.S.[C],
London, Ont.

INTRODUCTION

THE occurrence of a fetal death *in utero* is a great disappointment to the expectant mother. This is complicated by anxiety if delivery is delayed by many weeks, and may produce a severe depressive reaction.¹

Until recently, standard management² of this situation has been conservative, the obstetrician maintaining an uncomfortable balance between the anxiety and dislike on the mother's part and the potential danger of infection resulting from active interference.

In the last ten years, attention has been focused on the occurrence of a coagulation defect associated with deficiency of fibrinogen in the blood as a result of prolonged retention of the dead fetus; this deficiency, if it is not considered, not anticipated, or even more important not diagnosed, may result in severe uncontrollable postpartum hemorrhage, which is always dangerous and occasionally fatal to the patient.

REVIEW OF LITERATURE

In 1934, Dippel³ analyzed 306 cases of fetal death *in utero*; of these, 17 were known to have been dead for three weeks or more. He does not describe a single case associated with coagulation defect. In fact, he specifically states that the rate of postpartum hemorrhage was less than that of the average clinic patient. His management of these cases was very conservative. He states that he "very seldom found it necessary from the standpoint of the patient to induce labour because of fetal death *in utero*, and it is rarely if ever necessary to effect hasty delivery."

Tricomi and Kohl,⁴ analyzing 165 cases of intra-uterine death, reported only nine cases retained

longer than three weeks. In these cases there was no evidence of coagulation defect, nor any increase in incidence of postpartum hemorrhage. These authors are naturally very conservative in their management.

In an analysis of 407 cases, Grandin and Hall⁵ reported 365 cases in which the time of fetal retention was known. In only 22 cases out of these 365 was the fetus retained longer than 28 days, and in only eight cases was retention longer than 42 days. They reported one case of afibrinogenemia, but this was associated with severe abruptio placentae and a dead fetus which was retained for one day. They reported an incidence of postpartum hemorrhage of 6%, exactly twice the overall incidence. Their management was substantially conservative. Pritchard,¹ considering selected material, reported 100 cases of fetal death *in utero*; 50 patients retained the fetus for five weeks or more. Assuming 150 mg. % as the critical fibrinogen level, 32 of these women showed no evidence of coagulation defect. They retained the fetus for an average of eight weeks and their average gestation at the time of fetal death was 18 weeks. Twenty delivered spontaneously, seven had a curettage, four had oxytocin (Pitocin) induction and one was treated by hysterectomy. None of these women suffered severe post-partum hemorrhage.

On the other hand, there was a very different outcome in the 18 cases showing evidence of coagulation defect. The average length of gestation at which death took place was 24 weeks. In this group, nine patients received fibrinogen, two of whom subsequently developed homologous serum jaundice; only four patients did not require blood transfusion and two patients required hysterectomy. Pritchard's recommendations tend toward the radical, but such a wide experience must not go unheeded.

MATERIALS AND METHODS

The purpose of this paper is to present certain aspects of an analysis of 109 cases of fetal death before the onset of labour, encountered at Victoria Hospital, London, Ontario, during the years 1955-1960 inclusive. Two cases of coagulation defect associated with prolonged intra-uterine retention of the dead fetus are presented. As a result of ex-

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†Professor of Obstetrics and Gynecology, The University of Western Ontario, London, Ont.

perience with these two cases, a scheme of management is advanced which calls for reconsideration of the established "hands off" policy in certain of these cases, in the face of the possibility of this catastrophic complication.

CASE 1.—Mrs. A.K., a 28-year-old woman, was pregnant for the third time and had two living children. There was no previous history of bleeding or bruising tendency. Her last menstrual period was September 14, 1956, her estimated date of delivery was June 21, 1957, and intra-uterine death occurred on March 15, 1957. She was admitted to hospital on June 8, 1957, when the fetus had been retained for 11 weeks. She had no symptoms until two weeks before admission when she noticed the spontaneous onset of bruises on arms, legs, buttocks and abdomen.

Her past obstetrical history was as follows: In 1948, she was delivered of a stillborn child with the umbilical cord around its neck. At this time she received 1000 c.c. of incompatible blood. In 1950 she had a full-term child; there was an Rh incompatibility and an exchange transfusion was carried out, but the infant died at 3 months of age. In 1952 a legal abortion was carried out in Finland, and in 1953 she suffered an intra-uterine death at term due to Rh incompatibility. In the following year after she had undergone treatment with adrenocorticotrophic hormone (ACTH) and cortisone, a baby was born which lived after two exchange transfusions. The patient was Group B Rh negative and the husband was heterozygous Rh positive. The maternal anti-Rh titre was 1:256 by the indirect antiglobulin method. At the time of admission the general physical examination disclosed an obese Finnish woman, with poor oral hygiene but no bleeding from the gums. There were large bruises over her back, abdomen and legs; the largest of these, on the abdomen, was 3" in diameter. The uterus, the size of a 24-week pregnancy, was quite soft but the fetal heart-sound was not heard.

The fibrinogen content of the patient's serum was followed by means of the fibrin index (Fibrindex). The following values were obtained: On April 3, 1957, the Fibrindex value was normal, 5.2 sec., with normal clot formation. On April 15 this estimation was still within normal limits, 6.5 sec., and clot formation was normal. On June 6 the Fibrindex value showed no clot at 60 sec. and the clotting mechanism was grossly abnormal. Four days later, this estimation gave the same result: "No clot at 60 sec. Clot grossly abnormal." At this time the clot lysed at 65 min. The fibrinogen level was 70 mg. %; the hemoglobin was 76%, the red cell count was 4.7 million, and the platelet count was 220,000. The clotting time was 12 min. 9 sec., and the tourniquet test was positive.

On June 12, after 34 weeks' gestation, the hemoglobin was 74%, the red blood cell count was 4.7 million, the platelet count was 220,000, the bleeding time was 9 min. 3 sec., and clotting time, 12 min. 9 sec. The preoperative petechial test was strongly positive, petechiae appearing very rapidly all over the arm.

It was decided that this patient was suffering from hypofibrinogenemia. On June 11, 1957, at 11.30 a.m. a pitocin drip was started with 1 c.c. of pitocin in 1000 c.c. of glucose in water, at a rate of 100 drops per minute. Only a few slight contractions occurred

and the pitocin concentration was increased; with 3 c.c. of pitocin in 1000 c.c. of glucose and water, and the intravenous infusion running at 120 drops per minute, satisfactory contractions simulating normal labour were obtained. By 1 p.m. the first infusion was completed and another 1000 c.c. of 5% glucose in distilled water was started; this contained 5 c.c. of pitocin and was infused at eight drops per minute. This concentration of pitocin was extremely high; at 2.30 p.m., strong contractions were occurring; the membranes were bulging on rectal examination, and small parts could be felt descending through the cervix. At this point, the pitocin drip was stopped until fibrinogen could be prepared. At 2.45 p.m., with fibrinogen solution on hand, the pitocin drip was resumed. The patient was taken to the delivery room and was prepared and draped at 3.05 p.m. At this time, two infusions were running through 18-gauge needles.

At 3.05 p.m., examination revealed that the cervix was fully dilated; a breech presentation could be felt through the intact membranes. A fibrinogen infusion was started at a very rapid rate. The patient complained of a peculiar burning feeling in her face, a sense of impending death, and a feeling as if "everything was going to burst".

Under light anesthesia, the fetus, which was very macerated, was delivered by breech extraction at 3.15 p.m. The placenta was manually removed and the uterus explored. The pitocin drip was continued; the uterus was well contracted but the patient began to bleed extremely profusely. The uterus was re-explored and the cervix was exposed but no local cause of bleeding could be identified. There was no evidence of clotting in the blood that poured from the cervix. The general condition of the patient was maintained by rapid replacement of blood and fibrinogen. After 16 minutes, clotting resumed and the bleeding ceased. The measured liquid blood loss was 2600 c.c. A second infusion of fibrinogen was administered; it produced the same sensation of impending death, fullness and discomfort, and the patient became quite hysterical.

The sequence of events during delivery was as follows:

- 11.00 a.m. The Fibrindex was 29, the blood clot was poorly formed and the serum fibrinogen concentration was 70 mg. %.
- 11.30 A pitocin drip was started.
- 3.05 p.m. The patient was transferred to the case room and her membranes were surgically ruptured.
- 3.10 An infusion of 4.0 g. human fibrinogen in 500 c.c. of fluid was started.
- 3.15 A dead fetus was delivered.
- 3.16 The placenta was removed manually.
- 3.18 Continuous bleeding commenced; there was a total absence of clotting although the uterus was contracted.
- 3.22 The administration of fibrinogen was completed.
- 3.25 The first transfusion, 500 c.c. of fresh blood, was started.
- 3.35 The first unit was completed and a second unit of 500 c.c. of fresh blood was started.

- 3.45 A blood specimen was taken for fibrinogen index determination; no index was obtainable, because after the addition of Fibrindex no clot was formed. The quantitative fibrinogen level was 70 mg. %.
- 3.55 A second transfusion of fresh blood was completed and a third unit of 500 c.c. was begun.
- 4.07 The third unit of fresh blood was finished; 3.3 g. of human fibrinogen was started in 500 c.c. of fluid.
- 4.15 The infusion of fibrinogen was completed.
- 4.18 A fourth unit of fresh blood was started.
- 4.40 A fourth unit of fresh blood was finished; 5% glucose in distilled water was started.
- 4.45 A blood specimen was taken for fibrinogen index determination. The index was 9.5 and the clot formation was normal. The quantitative fibrinogen was 430 mg. %. The patient was returned to her room. The bleeding had stopped except for a very slight amount; on examination, clotting seemed to be present. Twenty-four hours later the quantitative fibrinogen value was 190 mg. %. The patient's postoperative convalescence was uneventful. Her total requirement for replacement was 2000 c.c. of fresh blood and 7 g. of fibrinogen.

CASE 2.—Mrs. N. was 30 years old, and her blood was Group A Rh negative. Her husband's blood was CDe-CDe. Her past obstetrical history was as follows: In 1950 she suffered from an antepartum hemorrhage, during induction (infant weighed 7 lb.), for which she required a blood transfusion. In 1951 a full-term normal delivery took place with no complications. In 1953 she was delivered of a full-term pregnancy; at this time she had severe jaundice. No transfusions had been given. In 1954, another pregnancy ended in a stillbirth at 30 weeks, the fetus weighing 2½ lb. In the following year, a fifth pregnancy ended in an intra-uterine death at 39 weeks; a 10-lb. fetus suffering from erythroblastosis fetalis was delivered. In 1956, this woman suffered an (inevitable) abortion at 2½ months. In 1957, a seventh pregnancy was complicated by hydrops fetalis and ended in a stillbirth. The maternal anti-D titre was 1:512 at this time.

For the pregnancy described in this paper, her last menstrual period was on June 19, 1959, and intra-uterine death was believed to have occurred on December 4, 1959.

The fibrinogen levels (Fig. 1) were as follows: On December 8, 1959, 319 mg. %; on December 15, 1959, 318 mg. %; on December 22, 1959, 312 mg. %; on December 29, 1959, 310 mg. %; on January 5, 1960, 325 mg. %; on January 12, 1960, 333 mg. %; on January 27, 1960, 155 mg. % and on January 28, 1960, 126 mg. %.

When the patient was admitted to hospital on this date, the fetus had been dead for eight weeks. A sterile vaginal examination was carried out. The cervix, which was tough and fibrous, was dilated one fingerbreadth and was 3 cm. long.

The sequence of events during delivery was as follows:

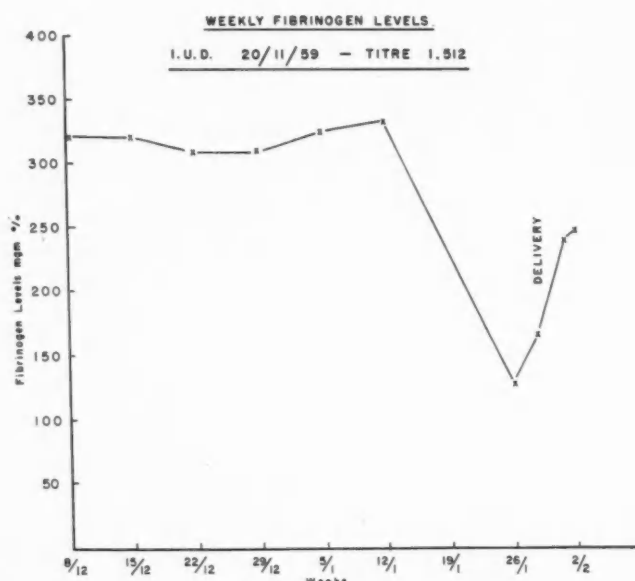


Fig. 1

- 9.10 a.m. A pitocin drip of 10 minims/1000 c.c. was begun.
- 12.15 p.m. The membranes ruptured spontaneously.
- 12.45 A macerated fetus was delivered.
- 12.50 The placenta was delivered, followed by approximately 500 c.c. of unclotted blood. The fundus was firm but moderate bleeding continued.
- 1.30 A transfusion of 1000 c.c. of blood caused an urticarial transfusion reaction. The patient was still bleeding moderately; her blood pressure was 80/60 and her pulse rate was 140 per minute.
- 2.00 - 2.40 An infusion containing 2 g. of fibrinogen was given.
- 2.40 - 2.50 A further infusion of 2 g. of fibrinogen was given.
- 3.15 An additional 3 g. of fibrinogen was given; the fibrinogen level was 150 mg. % and no fibrinolysin was detected. The patient had stopped bleeding.

On January 30, 1960, the fibrinogen level was 239 mg. % and on February 1, 1960, the fibrinogen level was 242 mg. %. The total volume of whole blood required for replacement was 1750 c.c., and 7 g. of fibrinogen was given.

DISCUSSION

It is very difficult to calculate the incidence of this rare complication; in any unselected series of intra-uterine deaths it is well below 1%. In our series of 109 cases, there was one case of severe coagulation defect, and one case in which the fibrinogen level dropped during retention of a dead fetus for 47 days. Pritchard's report of 18 cases of coagulation defect in this syndrome would represent that occurring in about 2000 unselected intra-uterine deaths.

It is more important to estimate the number of cases in which the fetus is retained for a period of five weeks or more. Pritchard maintains, and I

agree, that there is no danger of coagulation defect until the fetus has been retained for at least five weeks. In this series, six fetuses were retained for this period or longer, out of 99 in which the death-to-delivery interval was known, an incidence of 6% (Table I). In Grandin and Hall's series 22 fetuses were retained longer than 28 days—an incidence also of 6%.

TABLE I.

Prolonged retention of dead fetus—	
over five weeks.....	6 cases (6%)
Average gestation period.....	29 weeks
Cause of death—	
Rh sensitization.....	3
Diabetes.....	1
Unknown.....	2

It is known that this complication very rarely arises unless death has taken place after the 16th week of pregnancy. This observation is supported by Pritchard's analysis; the average time at which death occurred during gestation, in those cases with prolonged retention without coagulation defect, was 18 weeks, while in those who suffered from hypofibrinogenemia it was 24 weeks. Consequently, in about 95% of cases the problem will not even arise; and it is fairly safe to assume that it will not arise before 16 weeks' gestation.

The task is to ascertain which patients, in the 5% residue, are most likely to develop the defect, and carry out active interference in these patients.

Is this just a question of time? Grandin and Hall state that the earlier in pregnancy the death occurs, the longer the fetus will be retained, although the fetus is very rarely retained beyond term. Our figures are substantially in agreement with this point. Consequently, the time factor is important, but it may not be the sole factor involved.

Is this the prerogative of the strongly sensitized Rh-negative mother who has had repeated pregnancies? It has been my impression that this is the most dangerous group. In this series the average length of retention in the Rh sensitized patient was 20 days. It is known that the patient's reaction to an incompatible transfusion will produce a coagulation defect characterized primarily by thrombocytopenia. Perhaps speculation is permissible that a situation analogous to a prolonged transfusion of incompatible protein may exist in these cases.

Table II shows a comparison of the average death-to-delivery times according to the major causes of intra-uterine death encountered in the series; comparable figures from Grandin and Hall's series are included. Only those cases in which the death-to-delivery time is accurately known are included.

It will be seen that the times are similar; erythroblastosis fetalis is the condition associated with the longest fetal retention.

Is there a certain period of pregnancy in which prolonged retention is most likely to occur? To put

TABLE II.—AVERAGE LENGTH OF RETENTION IN 99 CASES IN WHICH DEATH-DELIVERY INTERVAL IS KNOWN

Cause of death	No.	Time retained (days)	G. and H. series
Rh sensitization.....	20	20	14.3
Unknown.....	31	11.5	7.9
Toxemia.....	16	6	6.8
Abruptio placentae.....	16	1.25	—
Cord complications.....	5	6	4.6
Congenital anomalies.....	5	8	9
Diabetes.....	4	20	6
Postmaturity.....	2	2	2.6

it another way, is there a point in gestation at which retention is very unlikely and when no precautions need to be observed?

Excluding abruptio placentae, the average time of gestation at which death took place was 33 weeks; after 35 weeks, only three cases were retained beyond three weeks, and none for five weeks. Under these circumstances our list of suspects can profitably be narrowed to exclude those cases in which fetal death occurs after 35 weeks.

Studies on localization of the placenta using radioactive iodinated human serum albumin (R.I.S.A.) have demonstrated that placental circulation continues in some instances after the intra-uterine death of the fetus has occurred. Continued placental circulation after three weeks' retention of the dead fetus has been demonstrated. This may be of importance; it may be the placenta with the intact circulation, through which the absorption of thromboplastic substance continues, which produces the afibrinogenemia, while the placenta in which the maternal circulation has been discontinued may have no absorptive power and act as an inert foreign body. The occasional case of hypofibrinogenemia which recovers spontaneously prior to delivery may result from cessation of the placental blood flow.

Finally, is this syndrome being produced by active induction of labour in these cases? Pritchard⁶ has proved that contractions resulting from pitocin, or from spontaneous labour, do not lower the fibrinogen levels, even when definite hypofibrinogenemia is present. This is supported by Salvaggio's study.⁷ With this as a background, it has been considered safe to observe these cases until the fibrinogen reaches the critical level and then to attempt to induce labour.

However, the documented experience of the two cases treated in this way raises doubt as to the safety of this course. Under these circumstances the use of pitocin may have tipped the balance against the patient, who then may have to be pulled back from the brink of death by heroic measures, not the least of which is the administration of fibrinogen. This approach exposes these patients to the immediate risk of severe hemorrhage and shock, and the remote risk of homologous serum jaundice.

Pritchard¹ states that in cases of intra-uterine death the fibrinogen levels decrease in a linear fashion by 50 mg. weekly. Therefore once the process has started, the blood becomes gradually defibrinated, causing the coagulation mechanism to become progressively impaired and placing the patient in a very vulnerable position when labour eventually begins.

This has not always been my experience. Often the fibrinogen levels are maintained until a sudden and unexpected fall occurs at a certain point. As a consequence, these levels have not been particularly useful in predicting *when* the critical point will be reached (Fig. 1). All are agreed that when the placenta has been delivered, circulating fibrinogen is replenished rapidly.

Two criticisms are commonly offered by those who oppose active interference to induce labour. The first is the potential risk of infection. This should not be discounted but must be guarded against. The second criticism concerns the possibility of failure of the pitocin induction; in my hands, this has been largely a question of dosage. With a macerated fetus, there is little anxiety over uterine rupture, and none over fetal distress. Under these circumstances, dosage far higher than that usually recommended must be used. Loudon,⁸ reporting on 18 patients suffering from missed abortion who were induced successfully with pitocin, used an infusion of 100 units of pitocin in 500 c.c. of glucose; one patient received 350 units of pitocin. This means that in these patients as much as thirty times the accepted dosage was used. The only unfavourable result was prolonged vasoconstriction in one case.

This course of management has now been successfully used in six cases between the 24th and 32nd weeks of pregnancy. In one instance of intra-uterine death of unknown etiology, an unsuccessful attempt at induction was carried out at 29 weeks of pregnancy using three consecutive eight-hour infusions containing 80 units of synthetic oxytocin (Syntocinon) in 500 c.c. of 5% glucose in water. Two weeks later, at 31 weeks' gestation, the same procedure was repeated and the patient was delivered five hours after the commencement of the second Syntocinon infusion. There was very little bleeding and this patient had no evidence of coagulation defect.

CONCLUSIONS

In view of these considerations, it seemed important to evolve a scheme of management which avoids the risks both of the wholly conservative approach and of the approach which involves carrying the patient to a critical fibrinogen level and then accepting the hazard of inadequate blood coagulation. Mature judgment demands a compromise which can be synthesized from the preceding discussion. No precautions need be taken before 16 to 18 weeks' gestation or until five weeks'

retention of the dead fetus has elapsed. This division automatically eliminates 95% of cases. In the remaining 5%, statistically, none will go beyond term, so that the cases in which death occurs after 35 weeks can be eliminated selectively.

Beyond 18 weeks' gestation, the earlier the death occurs the longer the dead fetus will be retained. By this line of reasoning, the group in which fetal death occurs between 20 and 32 weeks and in which the fetus is retained for five weeks covers most of the dangerous possibilities.

For this small and specific group the following management is recommended:

(a) The diagnosis of intra-uterine death should be positively confirmed.

(b) At three weeks after such death, the patient is warned to report any bleeding, particularly from the gums, or any unexplained bruising. No fibrinogen estimations need to be done; but clot observations should be carried out weekly.

(c) Even though it may cause anxiety to the mother, in view of the fact that many cases will have terminated spontaneously by five weeks, it is recommended that no active interference be undertaken until this period has elapsed. After this time, the patient is admitted to hospital. Radiographic studies are made to confirm the position of the fetus.

(d) Six grams of fibrinogen and 1500 c.c. of blood are made available.

(e) A Syntocinon induction is started. The infusion is maintained for eight hours and repeated daily for three days with increasing dosage until active contractions occur. This infusion must at all times be under careful control of the medical attendant. When labour ensues and the cervix is two to three fingers dilated, the membranes are ruptured. If labour does not begin with this routine, the patient is discharged for one week. A repetition of this procedure has not resulted in failure as yet.

(f) At no time did postpartum hemorrhage occur during this regimen, but, as a precaution, the Syntocinon infusion is continued for eight hours postpartum.

SUMMARY

Two cases of severe postpartum hemorrhage associated with fibrinogen deficiency due to the prolonged retention of a dead fetus are described.

An analysis of 109 cases of intra-uterine death of the fetus has been made.

Coagulation defect associated with fibrinogen deficiency will occur in less than 1% of unselected intra-uterine deaths.

Six per cent of intra-uterine deaths will result in retention of the dead fetus for more than five weeks, the danger period for hypofibrinogenemia.

The longer the dead fetus is retained the more likely is fibrinogen deficiency to occur.

As a general rule, there need be no anxiety unless the pregnancy has progressed beyond 16 weeks, and very rarely then is the dead fetus retained beyond

term; therefore the dangerous period is between 22 and 32 weeks' gestation.

When intra-uterine death occurs during this period of gestation, and after retention of the dead fetus beyond five weeks, there is a higher incidence of hypofibrinogenemia. *Consequently under these circumstances a more radical policy on the matter of termination of pregnancy is advocated.*

A scheme of management is outlined employing repeated high-concentration oxytocin intravenous infusions in order to achieve this end.

My thanks are due to Dr. D. P. Swartz and Dr. J. H. Walters for permission to use their cases.

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TREATMENT OF THE EMOTIONALLY DISTURBED PRE-SCHOOL CHILD: A FAMILY APPROACH*

N. B. EPSTEIN, M.D.,† Montreal

INVESTIGATIVE and therapeutic work with disturbed children focuses increasingly on the whole family rather than on the child who is presented as the patient. Recent publications by workers in this field have stimulated and reinforced this trend.¹⁻¹⁰

Our experiences in the McGill Human Development Study,^{9, 11-14} in the Family and Child Section of the Department of Psychiatry at the Jewish General Hospital in Montreal, and in private practice, have tended to support the view that it is extremely difficult, if not impossible, to treat a child satisfactorily unless the family is dealt with at the same time.

A child's personality structure is, of course, not completely integrated, and is to a large degree dependent upon and influenced by the various transactions within the family. The younger the child, the more this is so; and consequently therapy involving the family will be most important in the pre-school child. Surprising though it may seem, considerable opposition to this approach exists. Some individual workers and centres express strong opposition and avoid this approach in any form. Still others, while paying it lip service, adhere in practice to the more classical method of focusing primarily on the child as a patient, making only half-hearted gestures towards working with, perhaps, the child's mother.

The field of family psychiatry is still in its infancy. Ackerman¹ and Spiegel and Bell¹⁵ have recently dealt with the theoretical and methodological problems involved in excellent survey reports. Many workers in the field are engaged in active and often exciting experiments in order to

develop satisfactory theoretical formulations, diagnostic schemata and therapeutic techniques. An outline follows of our overall approach at the Jewish General Hospital to the treatment of the pre-school child, as well as a very brief report on the treatment of one patient who was seen in private practice (using the facilities of the hospital and other community resources).

From the time initial contact is made by a family with the unit, it is made quite clear to them that our approach is family-centred. We insist on both parents attending the initial diagnostic and screening session with the child. Occasionally, siblings are brought along by the family as well, although this is not specifically requested. This screening session is attended by most of the staff of the Family and Child Section. The family triad (mother, father and patient) is interviewed as a unit. During this family interview an attempt is made to achieve an understanding of the dynamics and pathology operative in the family. This would include the following information:

- (a) The family structure and organization.
- (b) The intra-familial transactions, past and present.
- (c) The way in which the various family members fulfil the roles expected of them.
- (d) The meaning of the illness of the particular member as presented by the family.
- (e) A superficial picture of the individual psychodynamics and psychopathology of the family members, including those not present at the interview.

After the interview, the staff engages in a thorough discussion of the interview process and content, and an attempt is made to form a coherent picture of the particular family under study. At times the staff is not satisfied that enough information has been collected. Further investigations will then be recommended, such as psychological testing, electroencephalographic examination, pediatric examination, further interviews with one or more family members, and liaison with school authorities. When all the necessary information is accumulated, a diagnosis is agreed upon.

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†Department of Psychiatry, Jewish General Hospital, Montreal; and Department of Psychiatry, McGill University, Faculty of Medicine.

Although the underlying theoretical orientation of the unit is that of psychoanalytic dynamics, there are many different possibilities for therapy in this type of approach. Flexibility of program is an ideal prerequisite, as is readiness on the part of staff members to try new approaches. Such procedures obviously result in an initial high level of anxiety among new staff workers, but this is rapidly counterbalanced by the sense of excitement which comes from working in uncharted areas, and the sense of fulfilment which follows the ability to see, understand and deal with the real problems of family life. Close supervision of therapy, as well as frequent conferences among the staff, further serves to minimize staff anxiety.

The following are among the different possible therapeutic programs followed for individual families:

(a) The treatment of the family unit as a group by one therapist. Occasionally, one or other members of the family may also be seen in individual session by the therapist.

(b) A very loosely defined approach where one, two or several members of the family are seen as a group, as time goes on, dependent upon exigencies arising as treatment progresses. This can be done either by one therapist throughout or by the therapist's role being shared by different staff members for different members of the family.

(c) The treatment is focused on the child in individual psychotherapy. The parents are involved only minimally—for guidance, direction and support, either with the therapist who is treating the child or with another therapist.

(d) The treatment is focused on the significant diad: either the mother-child, the father-child or the two parents. Other members of the family may be seen periodically if the need arises.

(e) The child may be placed in group therapy, or in individual plus group therapy. The parents may also be seen individually or as a pair, or in a group of parents.

The therapeutic approaches listed above are not rigidly fixed. A therapeutic program for a family might move through several different approaches during its course. Judgments concerning choice of therapeutic programs are based upon clinical findings.

We are at present developing a rigorously designed research program which will be closely tied to our clinical program. We hope that this, together with the findings in the McGill Human Development Study, will lead to a more sophisticated and developed conceptual framework within which to develop a diagnostic scheme of family psychopathology as well as a theoretical framework upon which to base the development of more scientific and clearly defined therapeutic techniques in this area.

A brief summary of the treatment of a pre-school child follows, in order to illustrate the utilization

of the family-centred approach in the actual management of one case in private practice.

The parents were seen together in the initial contact in order to discuss their problems with their 6-year-old daughter, Peggy. They had come for this preliminary discussion on the advice of the family pediatrician, whom they had first consulted on the advice of Peggy's nursery school teacher.

Peggy had been a severe behaviour and management problem for the mother since birth. They fought every step of the way. Peggy had suffered from severe recurring pavor nocturnus or "night terrors" since the age of 3. She exhibited frequent temper tantrums when frustrated or crossed. She displayed tics of varying sorts along with generalized and frequent writhing movements of the whole body. The mother claimed that Peggy was cold to her, never showed any affection to her, and that she was very suspicious of her. Peggy always accused her mother of not caring for her, of being mean to her, and of favouring her only sibling, a sister 4 years younger. The mother claimed Peggy brushed off and withdrew from any affectionate advances she might make to her. Peggy had a better relationship with her father, but this too was quite tenuous. The father was very fond of her, responded to her as if she were a little boy, and took great pride in her highly developed motor skills and athletic abilities. He actively encouraged her development along these lines.

The most outstanding pathological elements revealed during the subsequent examination of Peggy were the following:

(a) The marked flatness, superficiality and rigid constriction of affect. This aspect of her affective functioning seemed obviously to be a defensive adaptation against severe underlying depression.

(b) The superficiality, fluidity and evanescent character of her object relationships. She seemed incapable of developing a fixed image of any object, including herself. This was seen markedly during doll play. The objects changed rapidly from hero to villain and back again. The cowboy became the Indian, the sheriff, the bad man, within the space of seconds. This did not seem to make any difference to her, for everybody ended up being bad and destroyed, including herself.

(c) The marked intensity, quantity and pervasiveness of oral sadism. Peggy's world was full of bad people who were out to eat everybody else, and all ended by everybody being destroyed through being eaten and spewed out.

In summary, the overall picture was that of a child who had suffered severe emotional deprivation. The mother's story of her relationship to Peggy since her birth confirmed these findings. The mother was overwhelmed by the prospect of having to care for this much-wanted child. She worked compulsively at her job as a mother during Peggy's first year of life—driving herself to the point of exhaustion most of the time. The greatest difficulty occurred during feeding, and the mother

described every feeding session, almost from the start, as a "three-ring-circus". Finally, at the end of Peggy's first year, a nurse was brought into the picture, and she took over the whole rearing of the child. The mother turned to other activities in which she had been involved before Peggy's birth. The nurse followed a course of rigid coercive suppression in her dealings with Peggy. This continued for four years until the mother finally fired the nurse at the suggestion of Peggy's nursery school teacher. The mother claims that she had not been aware of any problem. She felt that some children were "just like that anyway, and there was nothing you could do about it." She also did not much question the nurse's dictatorial behaviour, either towards the child or herself.

Investigation of the mother revealed a very deprived woman who had had a terrible relationship with a destructive, non-giving, paranoid mother. At the beginning of treatment the mother was still locked in a highly ambivalent, symbiotic relationship with her mother. Her parents had separated when she was 13, and her early marriage was motivated by her unconscious desire for a reunion with her idealized, soft and loving, but absent and weak, father. She married a man whom she saw also as soft, weak and loving. There was much ambivalence and many sado-masochistic elements in this relationship. She submitted to much humiliating subjugation in many areas on the part of her husband in order to retain his love and to maintain her harsh domination and denigration of him in other areas.

The mother had a totally negative and devaluated image of herself, which in reality was the incorporated introject of the feared and despised grandmother. The mother, in turn, projected this negative image on to Peggy, which the latter had almost completely incorporated into her personality structure at the time she began therapy.

The father was suffering from severe emotional trauma and deprivation. He too was locked in an ambivalent relationship with a domineering, cold, suspicious mother, who had been unable to give much of herself to him. He also had a negative and devaluated self-image. In compensation for these marked feelings of inadequacy, he developed a strong interest in pseudo-masculine activities. He became very dependent on his wife, whom he over-idealized as a reaction formation against his violent hostility to his mother. He tended to project his own desired or hoped for self-image into Peggy, hoping to see in her the strong, masculine, independent and self-reliant person he could never hope to be.

Treatment began by seeing Peggy three times weekly and the mother once weekly. The short-term goal was to reduce the massive anxiety and tension present in Peggy, and to reassess the situation if and when that were accomplished. The therapy of the mother was supportive, with the aim of helping her in her maternal role with Peggy. Occasionally

Peggy and her mother would be seen jointly in the playroom, where their interaction was observed and interpreted.

Within the space of a few months the short-term goal was accomplished. The pavor nocturnus disappeared, the temper tantrums became very rare, and the tics and gross motor movements were almost totally absent. The superficial aspects of the mother-child relationship were smooth and peaceful for the first time in Peggy's life.

However, Peggy's affective pathology was relatively untouched. She was still able to relate only at very superficial levels and her suspiciousness remained strong. It was felt at that time that things would remain so unless and until the mother could come to grips with her own intra-psychic pathology. She had to develop a healthier self-image before she could be enabled to refrain from dumping her own "bad self" into Peggy. It was hoped that if this were done, Peggy might be able to develop a sound self-image and go on to be able to achieve a richer and deeper use of her emotions, as well as more meaningful object relationships.

Consequently the therapeutic program was changed. The mother was started in analytic therapy, at the rate of three or four times per week, and Peggy was seen once weekly in play therapy. This was carried on for the next three years. The mother improved markedly under this regimen and there was a corresponding marked reciprocal improvement in Peggy. She became warmer and able to relate on much deeper levels than previously. She was relieved of much of her paranoid and depressive rage as the relationship with her mother improved.

During this time the father was seen jointly with the mother many times. As a result, some of the difficulties in their relationship were considerably improved. The father was helped to become more independent and self-reliant, and developed much more confidence in himself as a man. His need to treat Peggy as a boy was somewhat lessened, and his competition with the mother for Peggy's affection was no longer necessary. Peggy developed a strong feminine interest although she remains an excellent athlete.

As Peggy moved up into higher school grades she developed learning difficulties as a result of some visual defects and concentration difficulties. She was referred to the hospital psychologist for remedial reading. After a time this did not fit her needs and she was then referred to a private school which specializes in cases of learning difficulty. In her one year as a day student at this school Peggy did quite well and moved along with her age level. After that one year, she was able to return to a special "opportunity" class in her own area school and at last report she was doing well.

In the last 1½ years of the mother's therapy, Peggy's visits were gradually cut down until they ceased completely. On the rare occasions when the mother felt that problems with Peggy were more

than she could handle, they were brought up in her own therapy and dealt with there.

Therapy on a formal regular basis with this family was discontinued about 1½ years ago after a period of 3½ years. The mother or father may occasionally still call for an appointment to discuss some issue that has come up. They continue to report that the improvement achieved during therapy in themselves as individuals and in the family as a unit is not only being maintained but further developed.

SUMMARY

The background of a family approach to therapy of the pre-school child is briefly discussed.

The overall therapeutic approach of the Family and Child Section of the Department of Psychiatry of the Jewish General Hospital, Montreal, is briefly sketched.

The case of a pre-school child seen in private practice, in which the family-centred therapeutic approach was used, is presented in summary.

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VIEWPOINTS

THE OBSCOLESCENCE OF LEISURE*

ELINOR F. E. BLACK, M.D., F.A.C.S.,
F.I.C.S., F.R.C.O.G., F.R.C.S.[C],†
Winnipeg, Man.

WHERE are we going—so fast and so far? What is the ultimate end of the pace modern man has set himself? Should we take time to ponder these questions or are we inextricably caught in a pattern of living which has outmoded contemplative leisure?

Leonardo da Vinci invented a flying-machine about 1492; it was one of his ingenious engineering projects that proved impracticable. At the same time Columbus sailed due west from Spain and after many almost hopeless weeks he reached the West Indies. In 1903, the Wright brothers made the first brief flight in an engine-powered vehicle. In 1961, Gagarin was rocketed into space, circled the globe in 89 minutes, and returned to his starting place. The time ratio of 411 years to 58 years which these events bracket expresses our present pattern of accelerated existence. Let us consider some of the obvious effects on the free world of the headlong hurry of our age.

Labour now has a 40-hour week and aims for one of 30 hours. Does this create a sense of leisure in the worker? Not at all. Figuratively, instead of inducing him to potter around his own garden it gives him time to be gainfully employed as some other person's gardener. The monetary rewards of his efforts, and probably his wife's too, enable him to buy a faster car so that he may outstrip his neighbours on a super-highway in the hope of reaching a holiday area before the usual Sunday crowd. Should he be aiming for a lake resort, he will find that other neighbours have employed their leisure in more remunerative pursuits and are able to tow elegant outboard motorboats behind their cars. The motorboats, once launched, will turn the lake into a noisy, dangerous liquid highway, on which to undertake a reflective paddle in a quiet canoe would be hazardous folly. Nor can the worker enjoy a leisurely trip back to his home after the outing, as the nerve-wracking jockeying for place in solid lines of traffic precludes it. Automation soon may reduce the worker's hours to considerably less than 30 a week. Will he learn to enjoy creative leisure, or will increased freedom spawn boredom and neuroses?

The businessman in former years looked forward to an afternoon on the golf course with his bag on his shoulder and much good exercise before him, using a minimum of clubs and a maximum of skill. Now he drags, in a cart, a club for every shot. I am

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†Professor of Obstetrics and Gynecology, University of Manitoba, Winnipeg, Manitoba.

told that the heavy bags are too tiring to carry, and also the cart speeds up the game and saves bending. If the businessman has suffered the ubiquitous "coronary", he can still play golf by riding in a motored go-cart, the exercise being obtained by taking strokes and keeping score. A leisurely, thoughtful amble along a bosky path would no doubt do him more good, but it would seem so totally unproductive to one not accustomed to quietude.

The bosky path, unfortunately, is rapidly disappearing from the landscape about our towns and cities. Should some pleasant wooded acres exist adjacent to a city, they are rapidly denuded to become suburban dwelling-areas where unshaded boxlike houses and garages are put up with scant breathing space between them. So we are back to the need of earning more money to buy bigger and faster cars to reach the refreshing country that retreats further and further before the onslaught of our progress.

Spoilage of the countryside by development companies and tax-minded municipal authorities brings us to modern architecture. Where is it going with its utility, absurdity, or stark nakedness of design that could not enhance the self-respect of a comfort station? Today the contemplation of a rococo or baroque building holds the eye in wondering amusement, but from the modern, rectangular, slabsided edifices of concrete and glass the eye hurries on, either reproached by manifest utilitarianism or dazzled by reflected light. Have we foresworn forever the vaulted grace of the Gothic, conceived by master craftsmen to uplift the minds and souls of men? No prefabrication there, or superhuman mechanical devices, but the skill and art of workmen trained in years of apprenticeship to an awareness of beauty.

The months Columbus spent traversing the Atlantic are now telescoped into six hours by jet-plane. There is on the drawing boards, I am told, a jet which should be in use by 1973, that will require landing clearance at Idlewild before it takes off from London Airport. The agility of man's brain cannot keep pace with the rapid transit and instantaneous communication that our progress has forced on us. We see evidence of this on occasion in the apparent ineptitude of our statesmen and envoys. In former decades, diplomats had time to give due consideration to pronouncements of consequence. Now the clamorous demands of press, radio and television force the diplomat or statesman to be an uncooperative "no comment" type, or to risk indiscretion by "talking off the top of his head". He has no leisure to arrange his thoughts and reach a considered judgment for the public utterance demanded of him. Or, if he is not immediately waylaid by communication hounds following an important, perhaps epoch-making meeting, he may have a few hours in a jet-plane to recuperate from the strain of the meeting and to formulate his presentations to his governmental

colleagues and the world at large. Our continent is a big one, yet in this jet age it is not uncommon for a public servant to address a breakfast meeting on the east coast, a luncheon meeting in the centre of the continent, and still find himself supposedly equal to a third address on the west coast in the evening of the same day. Small wonder that questioners and hecklers get under his guard at the third meeting! Lewis Carroll surely foresaw the jet age when he had the Red Queen breathless from running to keep in the same place. In stage-coach days a V.I.P. who missed the coach would wait philosophically for the two or three days to elapse until another coach was proceeding to his desired destination. Nowadays his counterpart cannot afford to accept with equanimity the missed section of a revolving door; fortunately electronics is rapidly removing this delay from his path.

What of solitude? Can modern man bear to be alone with himself? There is no need to be alone: the television and the radio provide continuous diversion. I recall a small village on the coast of Cornwall: a grey cluster of low stone houses which seemed to grow from the earth rather than being built upon it. The streets were narrow and winding, causing an embarrassment of intrusion to modern traffic. This town must have been at one time the quintessence of peaceful self-containment and solitude: Not now! From the roof of every cottage rear the angular tentacles of a television aerial. The anachronism of the spindly forest superimposed on the ancient village caused a definite twinge of nostalgia in the onlooker, although one could not begrudge the villagers their obvious real or relative prosperity. They too have joined the millions in mass spectatorship of whatever fare the television moguls see fit to provide. By the very nature of our modern living the enjoyment of solitude has been lost. Is this why we need more and more psychiatrists to straighten out the personal tensions and tangles resulting from lack of thoughtful self-recognition?

But what have all these questions and ruminations to do with obstetrics and gynecology? They delineate the milieu in which we practise and teach, and from which we draw our patients. We too are part of this world which has forgotten the necessity and the benison of leisure. What are we teaching our students and residents? Medicine through the ages has been looked upon as a learned profession; the adjective connotes more than manual dexterity, more than the ability to retain scientific formulae and facts. We can teach our residents to be utilitarian functionaries with a fine financial future, or we can teach them to be humane master craftsmen who cherish the patient and not the surgical procedure. Do we teach them anything about leisure and how to use it? Do we encourage them in cultural pursuits or direct them to worthwhile non-professional reading? If one listens to casual conversation between staff members and residents it is invariably of a medical

nature, usually discussing a case or some recently published scientific paper. Do we allow our residents time to read anything other than the multiplicity of publications in our special field?

Medical journals proliferate unconscionably on the desks, bookshelves and chairs in my office and home. Eventually they undergo a rapid conning and I am struck by the tiresome repetitiousness of the subject matter of the articles. I find myself wishing that a moratorium of many months could be declared on medical writing to give us time to digest, reject, and review our standards.

In the loss of leisure and the bowing to the pressures which surround us, have we not lost too a sense of quality? The German pastor, Dietrich Bonhoeffer,¹ while he was imprisoned by the Nazis and awaiting death, wrote some remarkable letters and essays. On the desirability of regaining a sense

of quality in our lives, Bonhoeffer wrote: "Culturally it means a return from the newspaper and the radio to the book, from feverish activity to unhurried leisure, from dissipation to recollection, from sensationalism to reflection, from virtuosity to art, from snobbery to modesty, from extravagance to moderation."

One final question to ponder: must we doctors continue to be carried along without protest in the strong current of modern living, or can we join with Charles Morgan² in spreading the belief that "release from the pressure of existence is a means of progress"?

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CASE REPORTS

ANÉVRISME DISSÉQUANT PRIMITIF
DE L'ARTÈRE MÉSÉNTÉRIQUE
SUPÉRIEURE

CLEMENT JEAN, M.D., F.R.C.P.[C],*
MICHEL MAROIS, M.D. et
PAUL BROCHU, M.D.,
Québec, Qué.

L'ANÉVRISME disséquant des artères périphériques sans atteinte de l'aorte ne se rencontre que rarement. L'observation anatomo-clinique que nous présentons intéresse l'artère mésentérique supérieure. Dans une revue de la littérature des 34 dernières années, Foord et Lewis² ne retrouvent qu'un seul cas d'anévrisme disséquant primitif de l'artère mésentérique supérieure¹ et en rapportent quatre observations personnelles.

OBSERVATION ANATOMO-CLINIQUE

Un homme de 53 ans est admis d'urgence à l'hôpital le 22 août 1959, pour de violentes douleurs abdominales. Après un début brutal, durant trois jours, la douleur a diminué progressivement d'intensité pendant une journée pour, ensuite, reprendre de façon très intense. Pendant ce temps, le patient a présenté des nausées et des vomissements alimentaires et bilieux. A son arrivée à l'hôpital, le patient se plaint de douleur surtout marquée au creux épigastrique et à la fosse iliaque droite. A l'examen de l'abdomen, on constate une douleur généralisée; la palpation provoque une défense musculaire surtout marquée à la région épigastrique et à la fosse iliaque droite. La tension arté-

rielle se chiffre à 140/90 mm Hg, le pouls à 60 pulsations à la minute et la température rectale est de 99° F.; il existe une leucocytose à 20, 150/mm³. Une radiographie simple de l'abdomen révèle la présence d'une quantité importante de liquide dans la cavité, sans signe de perforation.

Une laparotomie exploratrice quelques heures après l'admission permet de retirer environ 3,000 cm³ de sang en partie liquide, en partie coagulé, de la cavité abdominale. On constate en plus une infiltration hémorragique rétro-péritonéale qui s'étend de la bifurcation de l'aorte jusqu'au diaphragme, gagne le méso du côlon transverse, le ligament gastro-colique, le mésentère, et soulève le pancréas, le duodénum et l'estomac. L'exploration de l'aorte et des organes abdominaux ne révèle aucune lésion. Toutefois, comme le pancréas semble infiltré de sang et malgré l'absence de tache lenticulaire, on croit à la possibilité d'une pancéatite aiguë hémorragique. La cavité abdominale est nettoyée et quatre drains sont mis en place. Dans les suites opératoires immédiates, le patient se plaint de douleur abdominale. L'abdomen devient ballonné. La température rectale monte à 102° F. et le pouls à 110 pulsations à la minute. Le malade est agité et meurt 10 heures après l'opération.

A l'autopsie, pratiquée neuf heures après la mort, on retrouve dans la cavité abdominale environ 50 cm³ de liquide sanguinolent. En plus des constatations opératoires, on note que les anses grêles présentent des signes d'infarctus: la lumière est dilatée, la séreuse, dépolie, de coloration rougeâtre à noirâtre; la muqueuse, rougeâtre, présente ici et là de petites ulcérations irrégulières. L'aorte est intacte sur toute son étendue. Le prosecteur ne peut établir l'origine de l'hémorragie mais remarque au niveau du corps du pancréas un large foyer hémorragique en continuité avec l'artère mésentérique supérieure et il constate que celle-ci dans son segment sus-mésentérique est comblée par

*Directeur du laboratoire d'Anatomie Pathologique, Hôpital St-François d'Assise, Québec, Qué.



Fig. 1.

du sang. Le diagnostic d'anévrisme disséquant primitif ne devait être établi qu'à l'examen histologique des prélèvements. Sur toute sa circonférence, la paroi de l'artère mésentérique est dissociée par une large collection de sang généralement non coagulé (Fig. 1 et 2). Le clivage s'est fait approximativement entre le tiers externe et le tiers moyen de la paroi. Le cylindre pariétal interne est comprimé par le sang; le calibre de la lumière vasculaire est de ce fait très réduit. Sur les préparations histologiques, on ne retrouve pas de communication entre la lumière artérielle et la collection hémorragique intra-pariétale. En revanche, le feuillet externe est largement rupturé en un endroit. L'aorte présente un degré modéré d'athérosclérose.

DISCUSSION

L'anévrisme disséquant isolé d'une artère périphérique est une lésion rare. Dans une revue de la littérature de 1924 à 1958 Foord et Lewis² en retracent 31 cas et en rapportent 17 cas. Les artères intéressées sont par ordre de fréquence; l'artère rénale soit l'une ou les deux artères ou bien l'une des branches principales (12 cas); les artères coronaires (6 cas); les artères cérébrales (8 cas); les carotides (6 cas); l'artère mésentérique supérieure ou l'une de ses branches principales (5 cas); d'autres artères abdominales (3 cas); les artères pulmonaires ou l'une de leurs branches (4 cas); l'artère iliaque (2 cas); l'artère sous-clavière (1 cas); l'artère thyroïdienne supérieure (1 cas); l'artère rétinienne (1 cas). Dans 11 de ces 48 cas, un traumatisme est à l'origine de la lésion. Chez notre patient, on ne relève pas d'antécédent de traumatisme. Pour les autres cas, l'étiologie reste obscure. Foord et Lewis croient que, comme pour l'anévrisme disséquant de l'aorte, la médionécrose doit représenter le substratum anatomique de l'anévrisme disséquant des artères périphériques. La coloration de nos préparations histologiques au fer colloïdal par la technique de Hale n'a pu nous convaincre d'une augmentation appréciable de la substance fondamentale de la paroi de l'artère comparativement à d'autres témoins du même âge. Dans la moitié des cas rap-



Fig. 2.

portés, les patients étaient hypertendus. A son entrée à l'hôpital, notre patient avait une tension de 140/90; l'examen histologique des reins montre des signes discrets de néphrosclérose hyaline. Dans les 37 cas où la lésion est survenue spontanément, l'âge varie entre 50 et 70 ans et la majorité sont des hommes.

Dans la série de Foord et Lewis, cinq observations seulement se rapportent à l'artère mésentérique supérieure. L'un de ces cas fut une découverte fortuite d'autopsie. Un autre cas était simplement associé à un anévrisme des artères rénales avec infarctus des deux reins. Enfin, dans les trois autres observations, l'anévrisme a causé uniquement un infarctus de l'intestin grêle. Notre observation serait la seule qui se soit manifestée d'abord par une rupture de l'artère avec hémopéritoine pour se compliquer ensuite d'infarctus de l'intestin grêle.

SUMMARY

A case of primary dissecting aneurysm of the superior mesenteric artery has been reported. Dissecting aneurysms of peripheral arteries without aortic involvement rarely occur: only 48 cases have been found in the literature in the last 34 years; of this number, five involved the superior mesenteric artery. In the case described in this report, there was no history of trauma. The patient complained of severe abdominal pain, nausea and vomiting of three days' duration. The lesion caused a peritoneal hemorrhage and infarction of the small bowel.

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CHANGE OF ADDRESS

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A CASE OF MACROGLOBULINEMIA*

MARIA SERRATTO, M.D. and
J. FRANK ELLIOTT, M.D., *Edmonton, Alta.*

MACROGLOBULINS are a heterogeneous group of proteins of large molecular weight produced by the reticuloendothelial system. They have been identified in small amounts in normal sera.¹ High levels of macroglobulins in serum have been reported in association with some cases of neoplastic disease, collagen disease, chronic infections, nephrosis, cirrhosis of the liver and lymphomas.¹⁻³ These are secondary macroglobulinemias.

Cases described in which the increased production of macroglobulins could not be related to the presence of any distinct pathological process, and which appeared to be due to a primary disturbance of the reticuloendothelial system, have been called primary macroglobulinemias.⁴ The existence of primary macroglobulinemia as a separate entity has been questioned.⁵ The many cases that have appeared in the literature after the original description of Waldenström have presented a wide spectrum of clinical and laboratory manifestations closely related in the most atypical examples to those of multiple myeloma and lymphomas,^{2, 6} thus making differentiation difficult.

In a few instances little histological or hematological evidence of disease was disclosed, thus suggesting that, at least in these cases, the presence of macroglobulins was a manifestation of a primary disturbance at a "biochemical level".⁵ In the present state of our knowledge, it is not possible to prove whether the macroglobulins present in the above-mentioned pathological conditions are qualitatively normal or abnormal.^{2, 5} For all these reasons some research workers prefer to speak of macroglobulinemia as a syndrome.^{1, 2}

The purpose of the present paper is to describe a patient with macroglobulinemia followed up for approximately four years from what is believed to be the onset of the syndrome, the first changes noted being an increased sedimentation rate and an increase in serum globulin. In this case the differential diagnosis lies between the lymphoma group of diseases and Waldenström's macroglobulinemia.

A.W., a 45-year-old white woman, was admitted to the University of Alberta Hospital in 1957, with an acute respiratory tract infection, moderate, generalized lymph node enlargement, and moderate hepatosplenomegaly. Her past history included rheumatic fever at the age of 11 years with annual recurrence of painful, swollen joints, low-grade fever, sweating and listlessness for 31 years. A subtotal thyroidectomy had been performed at the age of 25, and three spontaneous abortions occurred between the ages of 26 and 29. Since the thyroidectomy, she had been taking thyroid. Al-

though she had several hospital admissions for the arthralgic manifestations, laboratory findings were consistently negative for recurrence of rheumatic fever. Throat cultures and A.S.O. titres were always normal and the sedimentation rate was consistently within normal values (see Table I). Roentgenograms showed mild hypertrophic osteoarthritis limited to the lumbar spine and sacroiliac and knee joints.

A markedly elevated sedimentation rate, elevation of serum globulin and proteinuria were first noted at the age of 45, in 1957 (Table I). At this time there was a neutrophilic leukocytosis, in keeping with an infection. Bone marrow examination was negative. A biopsy of a cervical lymph node was reported as showing sinusoidal hyperplasia. No other abnormal laboratory findings were noted.

Eight months later (aged 46), she was readmitted for fatigue, low-grade fever, arthralgia and tenderness over the right maxillary sinus, of six months' duration. On admission physical examination showed moderate hepatosplenomegaly and generalized mild, painless lymph node enlargement, as well as signs of acute sinusitis. Hematological studies revealed a normocytic anemia, a slight absolute lymphocytosis, an elevated erythrocyte sedimentation rate and one plus C-reactive protein. The Kahn test gave a doubtful result and the Wassermann test was negative. There was one plus proteinuria but no casts. Blood urea nitrogen and bromsulphalein retention values were normal, as was the antistreptolysin-O titre. The lupus erythematosus (L.E.) cell test was negative. Thymol turbidity was 15 units, and cephalin-cholesterol three plus; the serum globulin level was elevated.

After one week of hospitalization she was referred to the Mayo Clinic. Hematological investigation disclosed an anemia, normal white cell count and differential. Many of the lymphocytes appeared atypical. The platelets were normal at 118,000. Her bone marrow was reported as showing a marked lymphocytosis. Serum protein electrophoresis showed gamma globulin to be 2.11 g. %. Thymol turbidity was 10 units and cephalin-cholesterol 2 plus. The Kahn and Kline tests were positive. Two urine specimens disclosed the presence of Bence-Jones protein. No other abnormal laboratory findings were recorded.

Roentgen therapy to the spleen (1550 r in air) resulted in a moderate decrease in the size of the spleen and improvement of her general condition.

At the age of 47, she was readmitted to the University of Alberta Hospital for chest pain, productive cough, rusty sputum and general malaise, of three weeks' duration. On admission her temperature was 102° F. The patient showed oral herpes, and signs of consolidation of the mid portion of the left lung and left maxillary sinusitis, both confirmed by x-ray. The spleen was palpable 4 cm. below the costal margin. Moderately enlarged, soft, cervical and axillary lymph nodes were found. Laboratory investigations revealed a slight normochromic anemia, an elevated erythrocyte sedimentation rate and a normal white cell count and differential. The Kahn test was negative. The V.D.R.L. was positive to one dilution but was subsequently negative. The urine showed one to three plus protein. Sputum culture grew pneumococcus.

The patient was treated by antibiotics and discharged after 15 days of hospitalization, only to be readmitted five days later for recurrence of symptoms.

*From the Department of Medicine, University of Alberta Medical School, Edmonton, Alta.
For reprints write to Dr. J. Frank Elliott.

TABLE I.—RESULTS OF LABORATORY TESTS.

Age (years)	Hemo- globin g. %	Red blood cell count 10 ⁶ /c.mm.	White blood cell count 10 ² /c.mm.	White blood cell differential count Polymor- phonuclear leuko- cytes %	Lym- phocytes %	Erythrocyte sedimen- tation rate mm. in 1 hr.	Serology Kahn test	Other tests	Urinalysis Protein	Bence- Jones	Serum protein value Albumin g. %	Globulin g. %
11 to 42	12.1 to 14.0	3.36 to 4.87	86.5 to 290.0	—	40	5 to 18*	Negative	—	Negative	Negative	—	—
45	12.5	—	108.5 to 158.8	74 to 84	11 to 21	45*	Negative	—	Present	Negative	3.4	4.1
46	11.0	—	63.5	—	50	50*	Doubtful	Negative Wassermann	Present	Negative	3.8	4.0
46 (Mayo)	10.6	4.13	59.0	—	35.5	73†	Positive	Positive Kline	—	Present	—	—
47	12.1 to 13.6	—	62.5 to 113.0	52 to 82	13.0 to 39.0	41 to 50*	Negative	Positive to negative V.D.R.L.	Present	—	—	—
48	12.2 to 12.6	—	71.0 to 101.0	27	65 to 66	33 to 43*	—	—	Present	Negative	3.9 to 5.2	4.3 to 4.6
49	11.0 to 12.1	4.00	67.0 to 93.0	30 to 34	62 to 69	47 to 52*	—	Doubtful to negative V.D.R.L.	Present	Present	3.1 to 3.4	4.9 to 6.3

*Wintrobe. †Westergren.

Antibiotics were again administered and continued for several months after discharge because of persistence of the sinusitis.

She was readmitted one and one half years later at the age of 48, for an acute respiratory tract infection complicated by a left otitis media and sinusitis. Abnormal physical findings included generalized, mild, lymph node enlargement, moderate hepatosplenomegaly and slight fever. The erythrocyte sedimentation rate was elevated. There were slight relative and absolute neutropenia and lymphocytosis (Table I). Some of the lymphocytes appeared larger than normal, with a round nucleus and a lacy chromatin pattern. No nucleoli were present. The erythrocytes were normochromic and showed moderate anisocytosis and rouleau formation.

Bone marrow aspiration revealed a lymphocytosis of 95% and many denuded lymphocyte nuclei. Lymphocytes were mature. Other bone marrow elements were of normal appearance but reduced in relative numbers (Fig. 1). Serum protein showed reversal of the albumin/globulin ratio on one occasion. Urinalysis disclosed one plus proteinuria but no Bence-Jones proteinuria. Symptoms improved after administration of broad-spectrum antibiotics.

The patient felt fairly well for approximately three months although complaining of fever and sweating. A further exacerbation of the sinusitis, complicated by pharyngitis and otitis, required admission to hos-

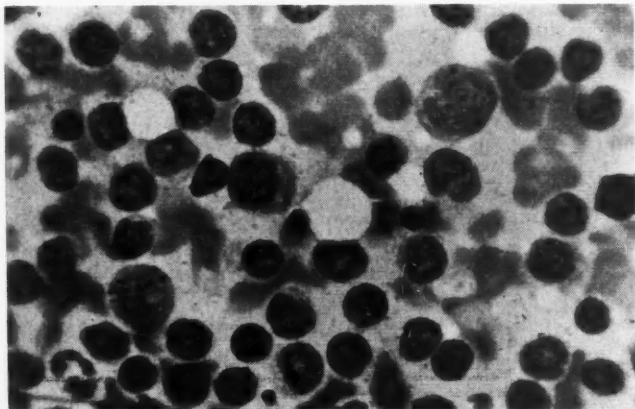


Fig. 1.—Bone marrow picture. Discussion in the text.

pital. At this time she was 49 years old. The physical findings were essentially unchanged.

Coagulation studies, including platelet counts, prothrombin time, Lee-White clotting time and Duke bleeding time, were within normal limits. Rumpel-Leede and direct Coombs' tests were negative. Hemogram, serum proteins, serology and urinalysis presented findings similar to those of the previous admissions (Table I). Latex fixation and L.E. tests were negative. The protein-bound iodine value was 3.4 μ g. % and serum cholesterol 230 mg. %. Culture of the nose and throat secretions grew hemolytic staphylococcus and later *H. influenzae*.

Agglutination tests for typhoid O, typhoid H, paratyphoid A, paratyphoid B, *Brucella abortus*, heterophile antibody and cold agglutinins were made before and after challenge with 0.5 ml. of commercial typhoid-paratyphoid antigen; these revealed no agglutination. The conclusion was reached that the patient was unable to produce measurable antibodies. Results of tuberculin skin tests carried out with increasing amounts of old tuberculin, up to 1 mg., were also negative.

She was treated with staphylococcus toxoid weekly, two transfusions of 500 ml. of fresh blood and antibiotics given in rotation. Before discharge her symptoms improved, the sputum culture showed mixed growth, and throat swabs were negative.

Three weeks later the patient was readmitted with a recurrent upper respiratory tract infection. On admission she had a temperature of 101° F. and difficulty in breathing, and appeared pale. The hepatosplenomegaly and the lymph node enlargement were unchanged. The rest of the physical examination, including the optic fundi, was negative.

Laboratory findings were as follows: leukocytes 11,200 per c.mm., with neutrophils 43%, lymphocytes 52%, monocytes 5%; hemoglobin value was 11.5 g. %, hematocrit 38% and erythrocyte sedimentation rate 47 mm. in one hour. The erythrocytes were normochromic but showed rouleau formation. The serum albumin level varied from 3.1 to 3.4 g. % and the globulins from 4.0 to 6.3%. The urine showed two plus protein but no Bence-Jones protein. Sputum culture grew *H. influenzae*. Radiographs revealed cloudiness of the maxillary and ethmoid sinuses bilaterally. Use of

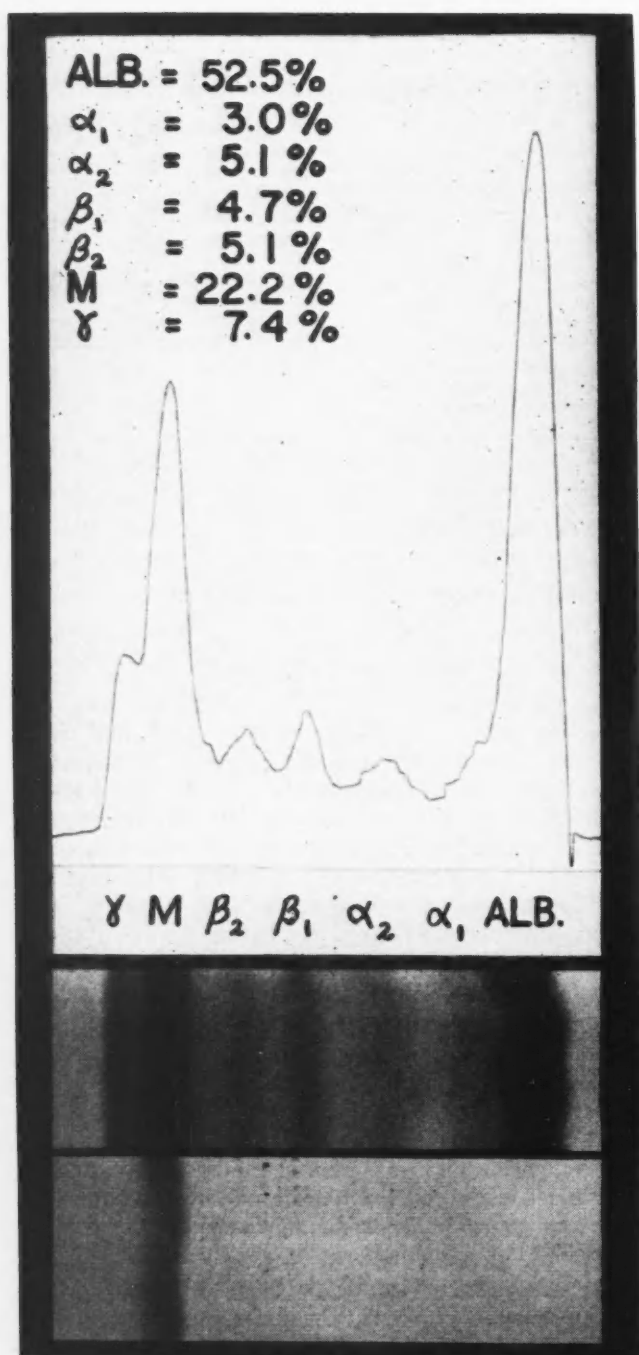


Fig. 2.—Serum (top) and urine (bottom) protein electrophoresis. Discussion in the text. Electrophoresis was carried out by a Durrum-type electrophoresis cell. Veronal buffer 0.05 M containing 0.005 % Ca^{++} in the form of calcium lactate; pH 8.6.

diathermy, antibiotics in rotation, and a combination of staphylococcus toxoid and immune human serum globulin did not bring about improvement. On the 32nd hospital day she was started on chlorambucil 4 mg. twice daily, which resulted in moderate improvement of the symptoms. Throat cultures showed no pathogens. Before discharge, 40 days after admission, the sputum culture again became positive for *H. influenzae*. The hematological picture was as follows: leukocytes 6700 per c.mm., with neutrophils 34%, lymphocytes 62% and monocytes 4%. Hemoglobin value was 11.0 g. %, hematocrit 34%, and the erythrocyte sedimentation rate 55 mm. in one hour. Serum albumin and globulin values were 3.1 and 5.0 g. % respectively.

Investigation of the Serum and Urinary Proteins

Serum and plasma protein tests were performed on specimens obtained during a single admission when the patient was 49. The Sia water test was negative on four occasions and positive on one. No cryoglobulins were demonstrated. Chemical separation of the gamma globulin showed a level of 0.73 g. %.

Paper electrophoresis disclosed a high, narrow peak in the gamma globulin range (Fig. 2). There was an increase in the P.A.S. staining reaction in the gamma globulin range in comparison with normal serum. Starch block electrophoresis showed a lack of migration of this segment. Ultracentrifugation* of serum showed that 20% of proteins had a sedimentation constant of 16.65 Svedberg units (Fig. 3). This was uncorrected for the Johnston-Ogston effect. Urinary protein was examined by ultracentrifugation of a sample obtained at a subsequent admission and showed a sedimentation constant of 2.93 Svedberg units (Fig. 3). Urine protein on paper electrophoresis was seen to migrate to the same region as the increased serum segment (Fig. 2).

DISCUSSION

In the case reported the diagnosis of a macroglobulinemia syndrome was suspected when the bone marrow and peripheral blood smears were examined and showed a marrow lymphocytosis and marked rouleau formation in the peripheral blood. Serum protein determinations disclosed an elevated globulin level. Paper electrophoresis showed a high narrow peak in the gamma globulin range.² The diagnosis was subsequently confirmed by ultracentrifugation of the serum, which revealed that 20% of the proteins were large-molecule globulins with a sedimentation constant of 16.65 Svedberg units. A high percentage of macromolecular proteins is characteristic of Waldenström's macroglobulinemia.¹ In keeping with the diagnosis was the lack

*Kindly performed by Dr. C. Kay, Department of Biochemistry, University of Alberta, Edmonton, Alta.

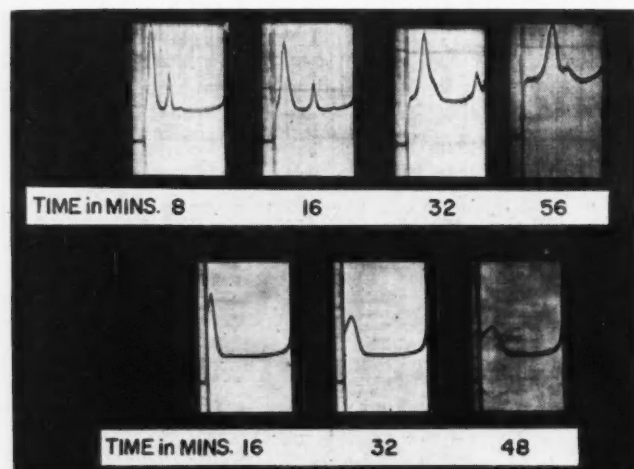


Fig. 3.—Top. Serum protein ultracentrifugation. S values uncorrected for Johnston-Ogston effect. Macroglobulin physiological (small fast component) S = approx. 20. Macroglobulin pathological (large fast component) S = 16.65. Globulin (normal) S = 5.98. Albumin S = 4.18. Bottom. Urine protein ultracentrifugation. S value = 2.93. Ultracentrifugation was carried out by a Spinco Model E, 59780 RPM. Serum dilution 1:5; 0.15 M NaCl; pH 7.0. Urine dilution 3:1; 0.15 M NaCl; pH 7.0.

of migration of the macroglobulin fraction on starch block electrophoresis and the deep P.A.S. staining of the gamma globulin band on paper electrophoresis. Chemical studies have shown that macroglobulins have a high carbohydrate content.⁷

The lack of reliability of the Sia water test as a screening test for macroglobulinemia has been pointed out by others^{2, 8} and was confirmed by this case in which a negative reaction was found on several occasions when macroglobulins were present in high concentration.

Other less specific findings due to the presence of the abnormal protein component were the marked rouleau formation of the red cells in the blood smear, increase of the globulin content of the serum, persistent marked elevation of the sedimentation rate of the erythrocytes and occasional positive serology, in the absence of luetic infection.

The presence of Bence-Jones proteinuria, although characteristic of myeloma, has also been noted in this syndrome.⁹ As in this case, the ultracentrifugal analysis of the urinary proteins usually yields small molecular weight components, possibly the result of depolymerization of the macroglobulins.¹ The electrophoretic migration on paper of urine protein was in the same position as the abnormal serum protein.

The bone marrow lymphocytosis exhibited by this case, with the presence of denuded nuclei, has been described as one of the features of Waldenström's macroglobulinemia.^{1, 2} The pattern of lymphocytes in the bone marrow may be diffuse or focal.¹ This appearance of the bone marrow, however, is compatible with a lymphoma. The case reported showed a slight absolute lymphocytosis. Lymphocytosis in the peripheral blood is stated not to be a feature of Waldenström's macroglobulinemia,¹ but other investigators hold opposing opinions.^{2, 10}

Clinically the patient here described presented the characteristic insidious onset of primary macroglobulinemia with lassitude, hepatosplenomegaly, and mild, painless lymph node enlargement described in typical cases of this syndrome, as well as recurrent infections.^{1, 2, 4} Since she was not well from early adolescence, it is not possible to give an exact time of onset of the disease or to state whether in this case the manifestations of Waldenström's macroglobulinemia took an unusually long time to develop.

Hemorrhages of the oropharyngeal mucous membranes and of the retinal vessels were also described by Waldenström as typical of primary macroglobulinemia. Subsequent reports⁹ have shown that hemorrhagic manifestations occur in approximately 60% of the cases. Different factors seem to be involved in their genesis.¹⁻³ This patient had not shown evidence of hemorrhagic diathesis, and her fundi were normal.

The absence of these stigmata and the findings of bone marrow and peripheral blood smears compatible with lymphoma or lymphocytic leukemia

make the differential diagnosis between primary macroglobulinemia and lymphoma difficult.

Recurrent infections are known to occur in many diseases of the reticuloendothelial system associated with failure of antibody formation. In this patient inability of antibody production was proved by the lack of demonstrable antibody response to antigenic stimulus. However, at this time the gamma globulin concentration was approximately 730 mg. %. This level is at the lower limits of normal. It may be conceived that on a quantitative basis the gamma globulin concentration was still too depressed for producing measurable antibodies or that the gamma globulins were abnormal and therefore not capable of acting as antibodies.

The relatively benign and slow course of the disease in this case is not unusual in macroglobulinemia. Two varieties of Waldenström's macroglobulinemia have been recognized, a malignant type which ends with death in a short time and a relatively benign form which is less frequent.¹¹

Recently, cases of Waldenström's macroglobulinemia have been described which were benefited by chlorambucil treatment.¹² With this suggestion in mind, our patient was started on this drug. However, the short follow-up does not allow evaluation of the effects of treatment in this case.

SUMMARY

The clinical case of a 49-year-old woman with macroglobulinemia is reported. Hepatosplenomegaly, painless lymphadenopathy, anemia with bone marrow and peripheral lymphocytosis, Bence-Jones proteinuria and positive serology in the absence of luetic infection were present. Recurrent respiratory tract infections and lack of antibody production after antigenic stimulus revealed the inability of antibody formation by the reticuloendothelial system. The macroglobulin was characterized by a sedimentation constant of 16.65 Svedberg units, a tall, narrow electrophoretic peak, a markedly positive P.A.S. staining reaction on paper electrophoresis and a lack of mobility on starch block electrophoresis. An electrophoretically homogeneous protein with a sedimentation constant of 2.93 Svedberg units was present in the urine. Although the basic process in this patient resembled Waldenström's primary macroglobulinemia, features compatible with a malignant lymphoma or lymphocytic leukemia were also present.

The authors wish to express their thanks to Dr. Harold Bell for his help and advice in the preparation of this paper.

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SHORT COMMUNICATION**PHOTOGRAPHIC ILLUSTRATION
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Unwanted areas are deliberately left out of the field of view in taking the original photograph. However, the original photograph may not be suitable if it was taken for another purpose. Circumstances during the process of taking the photograph may not have allowed exact framing of the scene. In reviewing the illustration the author may find that he prefers to alter the area shown. The photographer may not have been able to fill the negative with the desired area for fear of distortions or inadequate depth of field, or he may not have had suitable equipment.

Cropping is most effectively carried out during the process of enlarging. Cropping of a print may be performed by the author or publisher if the size and quality of the photograph permits, but it should be directed by the author.

There are certain limitations in cropping, and certain precautions should be borne in mind. The degree of enlargement of a portion of a negative will be limited by the sharpness and grain of the negative. The cropped illustration should not be smaller than the intended size of the illustration in print. Generally not more than one-half of the area of the negative or print should be cropped to preserve picture quality. In cropping, important landmarks should be preserved to permit recognition of subject matter and size relationships. Severe cropping may destroy the attractiveness of the illustration. The faults of a poor-quality photograph

which cannot be retaken will be exaggerated by cropping.

Although the medical author may have a good plan of the illustrations for the proposed report, he may leave the actual cropping to the publisher. His plan and suggestions should be submitted with the uncropped photographs. Where there are only a few illustrations, the occasional author is advised to leave the process of cropping to the publisher. The author who does so will have the opportunity of correcting any significant mistakes when he receives the engraver's proof of the illustration.

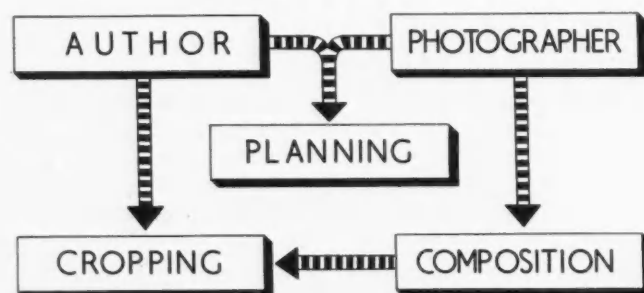


Fig. 1.—In addition to making the photograph, the photographer can be helpful to the author in planning, composing and cropping the illustration for publication.

The medical author may do his own cropping provided that the photographs do not have to be retaken or copied, or that new prints are not required because of small size or poor quality. Where there are a number of illustrations for a long article or a book, he ought to have the advice of his publisher or someone else who has had experience in this work. The publisher's requirements, periodically published by journals or sent to prospective authors by publishers, should be carefully studied.

Where the print is unsuitable, the author will need the services of a photographer to make a new print. If the negative is available, cropping may be performed in making the new print if the photographer is aware of the author's wishes. The photographer may be able to point out other improvements which are photographically possible using the available negative, from copying the original print or by retaking the photograph. The experienced medical photographer will be familiar with medical subjects and the requirements of medical publishers. Thorough planning by the author, detailed directions to the photographer for the taking of the photograph and constant supervision during all phases of the making of the illustration will be time-consuming but are essential for the preparation of an illustration which will meet the author's exact requirements.

*From the Departments of Surgery and Photography, St. Michael's Hospital, Toronto. This is the second in a series of five communications which are being published in successive issues.

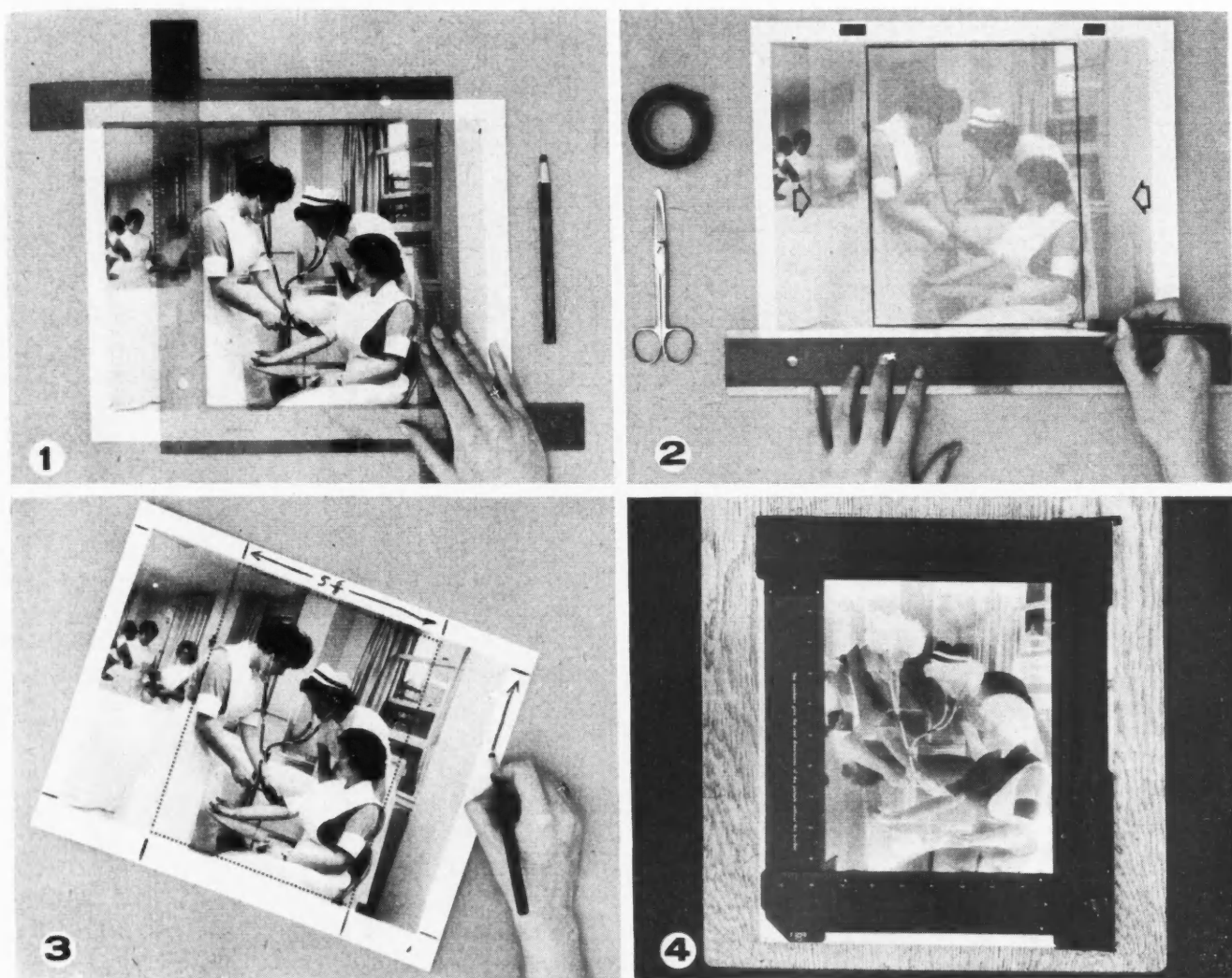


Fig. 2.—(1) The planning of cropping is simplified by the use of two right-angled rules. This photograph is greatly improved by cropping distracting and unwanted peripheral portions. (2) The author should never mark the face of the final print for cropping. His directions to the publisher are marked on a fixed superimposed sheet of tissue paper. In this photograph the arrows indicate the edges of the tissue paper. (3) Marginal marks may be used on a preliminary print to indicate the limits for cropping. If dimensions are included, it will be a complete guide for the photographer in making the final print. Although the author may use marginal marks without recording dimensions to indicate cropping for the publishers, the fixed tissue paper overlay is the preferred method. Where cropping is needed, the publisher's editor will make marginal marks. He will also record the exact dimensions of the illustration as it will appear in the publication. Where cropping is not needed, the editor will mark the exact dimensions of the published illustration on the reverse side of the print for the guidance of the engraver. (4) Cropping during enlarging. The easel is set to make an enlarged print of the proper proportion. The enlarger is adjusted to bring the desired area into focus within the frame. Cropping during enlarging eliminates the need for special instructions to the publisher.

PLANNING THE CROPPING

Cropping may be indicated by markings on a suitable large print or it may be planned during the process of enlarging. The cropping is planned by blocking peripheral areas in order to choose the most suitable field. Blocking is simplified by the use of two right-angled rules. Although right-angled rules are available commercially, the author can easily make a set from paper or cardboard. These rules are used to outline the field of the cropped print. When the field is chosen, guide marks to show the position of the rulers are made on the white borders of the print. The rulers are removed, and a piece of translucent tissue paper is placed over the print. The right-angled rulers are again placed in position, and an outline of the cropped print is lightly traced on the tissue paper which

has been fixed to the print. A thin sheet of glass may be inserted between the sheet of translucent tissue paper and the print, for protection.

The author may make marks on the white border of a print indicating the limits of the area he wishes to have shown in the final print. He may use this method to direct the photographer, but the author is not advised to indicate his wishes in cropping to the publisher by marginal marks.

CROPPING DURING ENLARGING

Where the negative is available, the most satisfactory method of cropping is by manipulation during the process of enlarging when preparing the final print. The experienced medical photographer will be able to crop during enlarging if he is familiar with the subject matter and the



Fig. 3.—This photograph was greatly improved by skilful cropping. The format was changed from horizontal in the uncropped photograph to vertical to suit the layout of this page. Cropping was planned on a proof copy and carried out during enlarging.

intentions of the author. The photographer will be guided by a proof print, if the author has marked the exact directions for cropping. If the author has had some darkroom experience, he may be

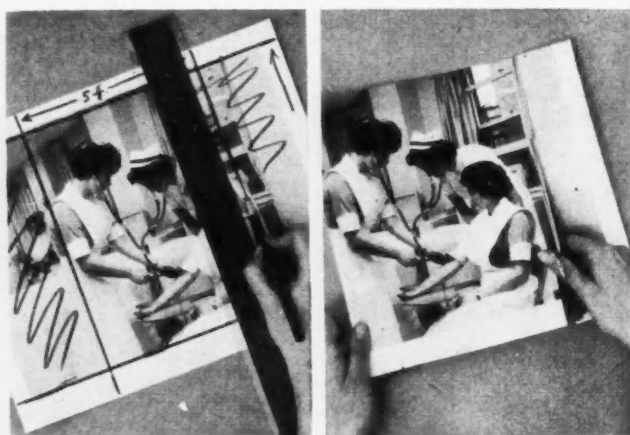


Fig. 4.—The final print to be submitted for publication or a print for which there is no available negative should not be defaced by marks or cutting. The author may use these methods on a proof print in ordering the cropping which will be carried out by the photographer in making the final print.

present during the enlarging process to direct the amount of cropping. It should be borne in mind that the final print should be somewhat oversize but of the correct proportion for the printed page.

A proof copy may be marked on the surface or margins and may be cut in ordering the cropping which will be carried out by the photographer in enlarging the final print. The final print should not be defaced by marking the emulsion or cutting off portions of the print. This may render the copy useless for other purposes and limit other possible rearrangements, and, if there are mistakes, they cannot be satisfactorily corrected.

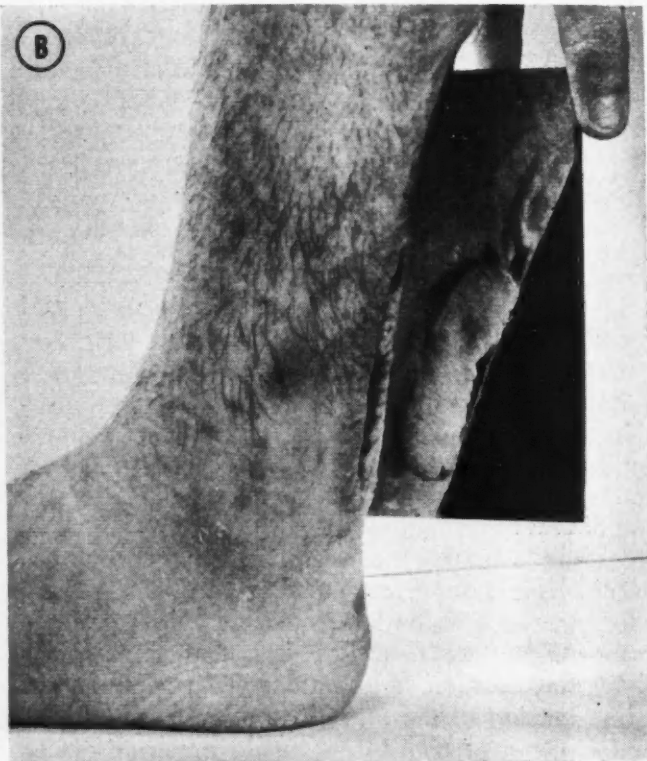
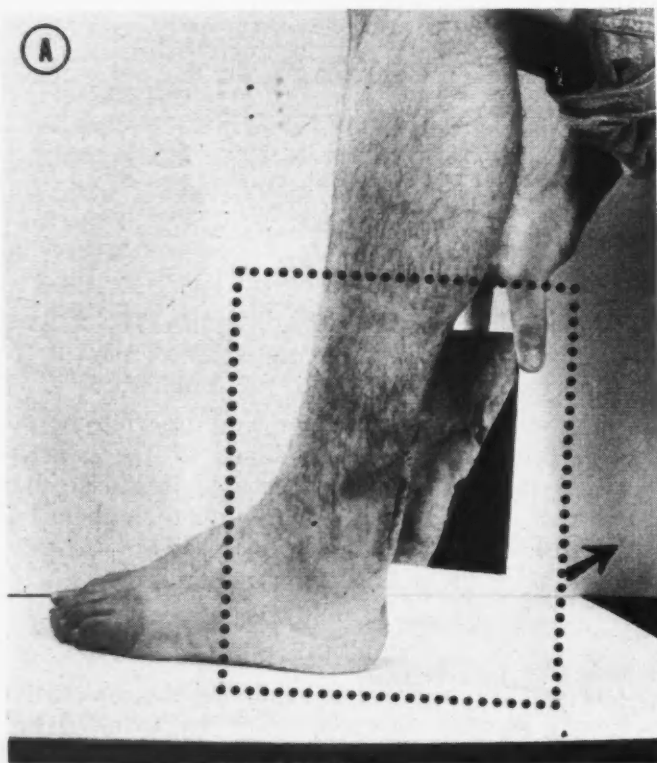


Fig. 5.—This mirror-subject photograph, showing a skin graft on the posteromedial aspect of the leg, was greatly improved by cropping. The author decided that the area of chief interest was the area outlined in (A) by dotted lines. At the author's direction, the photographer made print (B) which is an enlargement of the desired area in the proper proportion. This was the final print submitted for publication.



Fig. 6.—Lateral radiograph showing a posterior dislocation of the elbow joint of a 9-year-old girl. (A) shows the whole lateral radiograph. (B) shows an improved illustration by excluding distracting markers. Prints of radiographs for publication in most instances can be greatly improved by cropping.

Cropping can greatly improve photographs for publication. The author knows what he wants to show by the illustration, and he knows what pro-

portions are not important. The author is the one best qualified to direct, if not to carry out, the cropping of his illustrations for publication.

PAGES OUT OF THE PAST: FROM THE JOURNAL OF FIFTY YEARS AGO

It is obvious that percussion affords valuable information, but if we are to obtain the greatest assistance from it we must "knock" lightly. With a moderate degree of effusion, if the abdominal wall is thin, it is very easy to perceive the ripple-like fluctuation if the hand is not placed too near the spine, where the wall formed by the quadratus lumborum muscle is thick and tense. It is easy to obtain the flat note on light percussion, and the tympanitic one with heavier percussion, or with light percussion if the pleximeter finger be pressed slightly into the abdomen. The thicker the abdominal wall, whether from fat, muscle, or oedema, and especially if there is much loose, subcutaneous tissue from which fat has been absorbed, the more difficult it is to determine the existence of fluid by any means at our disposal. That these means of examination will, under favourable conditions, enable us to demonstrate a small quantity of fluid, I have proved by many years' experience. The method of examining advised by all the text-books to obtain fluctuation, by tapping on one side

of the abdomen with one hand while the other rests on the opposite side, is futile, except in cases in which the quantity of effusion is so great as to distend the abdominal wall beyond the reach of the intestines, then the "ripple" wave can be obtained from flank to flank; but this is a state in which the condition is so obvious as scarcely to need demonstration.

Even if the correctness of these views is granted, the importance of the facts may be questioned. It may be regarded as a refinement of examination that is unnecessary in these days of advanced laboratory and other methods. But especially for the reason that laboratory methods are so advanced and developing so rapidly, it is probable that at no period in the history of medical science and practice is exactitude of clinical, that is bedside, investigation in greater need of inculcation and practice than in the present.—Alexander McPhedran, *Canad. M. A. J.*, 1: 937, 1911.

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TEENAGE MORALS

"WELL the real reason I began to write was so that people should have an idea of how we teenagers live. I mean nobody ever does write about us unless its something bad, and we should all know how the other half lives."¹

The present state of teenage morals is a matter of much interest and no small concern to most adults and particularly to the physician who often has young children of his own to understand and to bring up "in the nurture and admonition of the Lord". Furthermore he is believed, because of his training and professional status, to possess special knowledge bearing upon this intricate subject. This is a very difficult position for the physician-counsellor, even when he feels competent to advise his patients on the strength of a long and intimate association with them. For this reason, articles such as those which appeared serially in the British weekly *Education* from March 3 to April 14, 1961, now available in the form of a pamphlet entitled "Teenage Morals",^{*} could be read with benefit by members of the medical profession. This series is doubly welcome because of the importance of the subject and the commonsense approach adopted by each of the contributors. The atmosphere of this symposium is encouraging, because topics like these are approached only too often in a state bordering on hysteria. The home truths that abound in this series would have a calming and healing effect if they came from that reassuring figure, the family doctor.

The introduction suggests that many of us need to reconsider our attitudes in this matter when it observes: "There is clearly a good deal of public anxiety on this whole topic—usually allied to strong feelings and slender knowledge. . . . People generally, and schools and education authorities particu-

larly, are going to have to discover reserves of sympathetic understanding, well concealed hitherto. The genuine difficulties and perplexities of a changing situation are great enough without a barren clash of generations."

In the first of six articles in this symposium the rudimentary data bearing upon the matter of juvenile promiscuity in Great Britain: the Registrar-General's figures, the crime statistics, and venereal disease rates are examined. From the evidence available there seems to be little support for the alarmists' view that modern youth, in Great Britain at least, is generally promiscuous, immoral and licentious. For example, the illegitimacy rate remained remarkably steady at 14 or 15 illegitimate births per 10,000 women over the period 1948 to 1958. The total number of confinements increased sharply between 1953 and 1958, but the proportion of illegitimate births and legitimate births conceived within eight months of marriage remained much the same.

These and similar figures are sparse enough and they apply only to the very small minority of teenagers who commit crimes, become pregnant outside wedlock or contract specific diseases. Statistics such as these can only be used in a discussion on the larger topic of teenage morals after they have been shown to provide reliable evidence about "those who don't come before the courts, or provide the Registrar-General with a live birth, or become infected."

A child welfare officer writing on this subject²—her paper was entitled "The Road to Promiscuity"—makes a distinction between "the casual promiscuity of the countless young people who enjoy sexual relations with acquaintances at parties, dances or on holiday, regarding this as a purely incidental factor in the general enjoyment of life" and the "habitually promiscuous" who find their way into the VD figures. "The promiscuous girl is a social misfit, in rebellion against the discipline of civilization or unfit to conform to the community's demands. An attempt to generalize about the road to promiscuity leads to no safe, broad conclusion. The promiscuous spring from every class of society and every type of home. Lack of intelligent and affectionate approach by the parents is a predisposing factor . . . but for every girl impelled to promiscuity by external factors, a girl can be found in precisely similar circumstances who has resisted them. . . . Each travels her personal byway to promiscuity." The distinction between "casual" and "habitual" promiscuity is useful because the statistics about crime and venereal disease incidence are probably not valid evidence about the former, and the latter condition, important though it is as a social malady, has little if any bearing on the moral behaviour of the normal, non-delinquent, non-maladjusted teenager.

Judgments on the behaviour of the teenager must be based on the results of well-designed studies of those truly representative of this segment of the

^{*}Published by Councils and Education Press Ltd., 10 Queen Anne St., London, W.1, 1961. 24 pp. 2s. 6d. postpaid.

population. Typical of the type of study that is much needed today is an inquiry into the circumstances and attitudes of 62 young unmarried mothers, under 18 year of age at the time of conception, that was carried out in Manchester, and referred to recently in the editorial columns of the *British Medical Journal*.³ These workers recognized that the factors leading to extramarital pregnancy were complex, their recognition and delineation difficult, and their extension in terms of the general teenage population doubtful. They concluded that "in about three-quarters of the cases the pregnancy followed on naturally enough from the pursuit of adolescent practices normal to the whole society. It arose from a choice of mate, usually from the same occupational level, and from deliberate association with him. All but two of the girls said they had had no previous intercourse with other men, but a large majority had had repeated sexual experience with their mate, generally in firm expectation of marriage. For the majority, the permissibility of sexual intercourse lay in established personal relationship with the man; promiscuity as such was regarded as wholly unattractive."

A cool, dispassionate view of the problem, as seen through the eyes of an anthropologist, is presented in the second article of this series. It appears that the question is not whether or why teenagers engage in sexual activity, but why the adult community should find this remarkable. The importance is stressed of the system of "social childhood" which advanced societies seek to impose on their young, keeping them at school, and, ostensibly at least, in subjection long past the age at which they reach physical maturity. When we consider it "unnatural" for young people between the ages of 13 and 20 to have sexual knowledge or experience, we have re-defined childhood on a social rather than a physiological basis. Our society envisages childhood ending, not at puberty with its dramatic physical termination, but at the completion of a prolonged educational experience or apprenticeship. The "social children" of our society have been physiological adults for years and we are upset because they behave according to their physiological state rather than to our social definition. In Great Britain, up to the present time, the idea of "social childhood" has never been accepted outside the middle and upper classes. One effect of increasing the school-leaving age is the imposition of this status of social childhood on young adolescents throughout the entire community. This will prove difficult, because lower-class youths typically have had the rights and responsibilities of adults as soon as they begin earning their living; and women of all classes have been considered sexually mature and marriageable, after the menarche.

From an anthropological point of view, it seems that "It is more difficult to understand why, when they have the opportunity, post-pubescent refrain from sexual intercourse than why they indulge in it. The conditioning they have undergone, and the

fear of punishment, either realistic or supernatural, must indeed be strong to inhibit the expression of such urgent desires." It is remarkable that "We are putting a greater weight of responsibility on young girls today than they ever had to bear in the past for their own sexual conduct; and at the same time we demand that they preserve the chastity which earlier generations of older people guarded so watchfully. This is unrealistic; if we value virginity so highly, we should construct social institutions to protect it; if we think independence a higher value than chastity, then we must expect heterosexual experimentation."

The position and viewpoint of a physician, who is also a psychologist, is set out in the third article in this series, in which the problems of physical and emotional growth are examined in a society dominated by the values of the mass media; and the impact of confused and conflicting adult standards on young people is noted. The sound and temperate opinions expressed here carry conviction: "They have problems to solve peculiar to their age, and in view of the pressures to which they are subjected it is surprising that they manage so well. How they react to sex depends in the last analysis on character. The conditions of modern life are in some ways unfavourable to the development of a stable character endowed with a sense of social responsibility. . . . Laxity in sex matters—where it exists—is a symptom of a general lowering of ethical standards throughout our present-day society. 'I'm all right, Jack' expresses the attitude of a wide area of the adult world from which the teenager imbibes his philosophy of life. Where else could he get it from? The school-leaver is thrust into the ruthless competition of offices or factory where cheating the tax man at the top or petty fiddling at the bottom are often taken as a matter of course. The old-fashioned virtues of thrift and integrity are laughed at."

An additional influence that has intensified the problems of the teenagers is the fact that both sexes now reach puberty earlier than past generations. In 1858, the average age of first menstruation was 17 years; in 1950, it had fallen to 13.7 years. The interval between the time when sexual desire is strongly felt and when it can be satisfied in marriage is longer. The average age of marriage has come down but not enough to offset earlier adolescence; consequently there is a critical period, overlapping with school, during which adolescents need special support and guidance. This development has coincided with changes in family life which give less security than before; the teenager is set adrift without adequate preparation and at the height of an emotional crisis in a world he did not make. We need "a system of training which is not indoctrination but the cultivation of a character resolute enough to choose a way of life which bears the stamp of individuality. If we can bring up children to be good citizens and responsible parents the maladjustments inevitable in an age of transi-

tion will right themselves. The problems of the teenager are of society's own making."

A recent review of the pamphlet "Teenage Morals" began with the quotation: "Society, sir, has been so long going to the devil that it is devilish odd it has not yet come there," which serves to comfort the reader by reminding him that these problems are not new. And yet returning to the role of the physician, there are several areas of human experience upon which the physician can never, perhaps should never, finally make up his mind; subjects upon which he should always be willing to hear something more. The difficult area of human morality is surely one of these. What acts should the physician actively resist in others and what conduct does he, by default, seem to approve because he does not pronounce upon it? The patient watches him carefully and when the doctor assumes the role of oracle he does so at his own risk; but in matters of emotional or physical health, is he free to keep silent? This whole matter is given a sharp edge in Comfort's penetrating summation:⁴ "There is unfortunately only one way of making sure that the mature bodies of our children contain the emotionally mature minds which are needed for the painless management of all personal relations, not only sexual ones; and that is by our own example."

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THE REPORTING OF TOXIC HAZARDS

AN ACCOUNT of the intensely toxic nature of the combustion products of Teflon (tetrafluoroethylene resin) appears in the Letters to the Journal section of this issue. The development of suitable homograft material and plastic prostheses has made arterial replacement procedures popular for the relief of major occlusive disease in the extremities. The difficulties in procurement and storage of arterial homografts have led to the use of plastic prostheses as materials of choice. Polyethylene (Dacron) and polytetrafluoroethylene (Teflon) are currently preferred by most surgeons. The latter is one of the most inert plastics yet discovered; its most unique characteristic is its nonwettability. It cannot be made wet with water and practically nothing will adhere to it. Implantation in body tissues for periods up to one year does not cause any loss of strength, while Nylon loses about 80% of its strength owing to hydrolysis and chemical deterioration. In addition to its use in tubular prostheses, Teflon mesh, as a loose-weave fabric, has been used successfully in the repair of difficult hernias in place of tantalum mesh. In this situation, it has the advantages of ease of handling, availability and low cost as compared to tantalum; its proven strength in body tissues over long periods without chemical deterioration or fragmentation; and its inertness to body tissues, which equals that

of tantalum. A synthetic prosthetic material with these characteristics is likely to find increased use in surgical practice.

Therefore, the report of an unsuspected and highly lethal hazard connected with the use of this synthetic material is of great interest. It is hoped that this information will be transmitted through our readers to operating room personnel, hospital administrators and others who have any occasion to use or handle this material. A particularly strong warning must be given to the compulsive smoker, because the accidental contamination of the burning cigarette (so well illustrated in the case described by Mack) is one of the few ways, short of an actual fire in the hospital, factory or warehouse, in which the toxic by-product of Teflon, perfluorobutene, can be produced and inhaled.

Physicians who detect and report a toxic hazard when it is still of uncommon occurrence do the profession and the public a genuine service. But a word of comment is necessary on the proper form required for these intra-professional communications. In several ways it is more difficult to write a good letter to the editor than it is to write a short article or an original paper. This difficulty recalls a postscript attributed both to Pascal and to Thoreau: "I would have made the letter shorter, but I didn't have time." The good letter requires the judicious selection of just those materials necessary to convey information and carry conviction. When a hazard is reported, when a drug is cited because of an undesirable side effect or when a hypothesis is proposed from clinical observations, sufficient evidence must be given to allow the reader to judge, on the spot, whether the conclusion is justified. These criteria have been fulfilled by Dr. G. J. Mack in his letter that appears elsewhere in this issue.

From time to time, the Journal receives letters from physicians in which, for example, it is alleged that a certain drug has caused death or injury to patients under their care. Often, in these letters, there is no case history, no account of the other factors which might have been responsible for the patient's illness, and no details of clinical investigation. The assertion is made without the presentation of satisfactory evidence or an attempt at differential diagnosis.

The Journal recognizes its duty to provide a medium in which any physician can communicate with his fellows on a professional level. However, these communications should conform to certain minimum standards. In this regard, may we recommend that type of letter to the editor which is in essence a case report in brief. These have been a feature of the correspondence columns of the *British Medical Journal* and *Lancet* for many years. Any physician who has occasion to write a letter to the editor on a subject which needs the support of clinical evidence could do no better than to study a few of these letters and use one of them as his model.

Letter to the Journal

TOXICITY OF DECOMPOSITION PRODUCTS OF "TEFLON"

To the Editor:

Information has recently been brought to my attention by our Safety Department at the Kitimat Works of the Aluminium Company of Canada regarding the toxicity of Teflon (Dupont's tetrafluoroethylene resin). Although undoubtedly a rare hazard, it has the potential of becoming a very serious one.

The thermal decomposition of Teflon results in a toxic gas, perfluoroisobutene, which is about ten times as toxic as phosgene. However, tests have indicated that the toxic decomposition does not occur below 400° F., and no ill effects have been reported by individuals exposed to Teflon heated below this temperature. Because of the extremely toxic nature of the decomposition products of Teflon, disposal of waste Teflon becomes a special problem. These parts should not be disposed of as common waste but should be buried in the ground. The reason for this extreme precaution is that minute quantities of the decomposition products of Teflon can cause serious illness and even death. This information is derived from the British Columbia Fire Chiefs' Association Notes and News (3rd Edition).

The following case illustrates this: An employee laid a lighted cigarette on the edge of a sheet of Teflon

and later picked it up and continued smoking. The cigarette had become contaminated with enough Teflon to cause this employee to become violently ill, and he later died from edema of the lungs caused by the inhalation of the gas, perfluoroisobutene.

All scrap Teflon should be accumulated in a covered metal container painted a distinctive colour and marked SCRAP TEFLON in large letters. Until this container is full, it should be kept in an isolated area of the plant or hospital where the possibility of fire is remote. When the container is full, it should be buried at a depth of at least four feet. In the event of a flash fire in an area where Teflon is in use, extreme caution should be taken to protect employees from exposure to decomposition products of this resin.

Teflon has advantages which have led to its use in industry for piston rings, valve spindle coatings and various gaskets. I was not so aware of the potential hazard attached to it, and perhaps other surgeons are not. The problem is an administrative one rather than medical, but demands the serious consideration of any physician attached to any industry where this agent is in use. Personnel in the operating theatre and other hospital staff members who come in contact with it during reconstructive vascular surgery must be aware of the risk.

G. J. MACK, M.D.,
Chief Medical Officer

MEDICAL NEWS IN BRIEF

EFFECT OF CORTICOTROPIN AND STEROID DRUGS ON BILIRUBINEMIA

Administration of steroids or corticotropin results in a greater fall in concentration of serum bilirubin in patients with hepatitis having obstructive features than in patients with jaundice due to cirrhosis or extrahepatic obstruction. This differential reduction in bilirubinemia, described by Summerskill (*Am. J. M. Sc.*, 241: 555, 1961), often enables the two causes of jaundice to be distinguished.

In patients with acute hepatitis, reduction in bilirubinemia is associated with a striking increase in caloric intake and improvement in respect of chemical tests of hepatic function. Studies in dogs with jaundice after ligation of the bile duct showed that cortisone had no effect on the concentration of serum bilirubin or on erythrocyte survival time.

It is concluded that steroids or corticotropin influences jaundice *only* by their effect on hepatic function. Evidence is put forward to suggest that this may be a specific action limited to hepatic disease that is associated with autoimmune factors.

DEMETHYLCHLORTETRACYCLINE PHOTOTOXICITY

Saslaw has described a phototoxic reaction due to demethylchlortetracycline incurred by himself while on an automobile drive after he had been taking 300 mg. of the drug, three times a day, for purulent bronchitis, for a period of five days (*New England J. Med.*, 264: 1301, 1961). He had a deep tan at the time. He was driving on a sunny day, with the temperature in the 60's, and had all the car's windows closed, except for a slight opening in the vent window on the driver's side.

Within one hour, the sunlight entering through the opening in the vent elicited a phototoxic reaction in his hands, consisting of edema, erythema and swelling. At this time the vent was closed, but within five and a half hours small pruritic vesicles appeared.

He discontinued taking demethylchlortetracycline, but pruritus, edema and erythema persisted for one week, and his hands were particularly sensitive to warm water and soap for two weeks. By the second week the skin had begun to peel. Subsequently, improvement was slow and gradual. However, even as

late as three months after exposure, the area of residual pigmentation was still evident.

The phototoxic reaction to demethylchlortetracycline can occur on skin exposed to sunlight and artificial ultra-violet sources, and is not prevented by a previous tan. There is apparently a dose relation. Further phototoxicity apparently does not occur, once the drug is discontinued and excreted. Most, but not all, reactions occur in the summer months, and it is estimated that photosensitivity develops in an over-all average of 3 to 6% of patients. However, a rate as high as 30 to 60% has been observed in controlled studies of induced photosensitivity with 600 mg. daily doses. Persons showing reactions have a lowered erythema threshold, with an increased erythema response and prolonged persistence of postirradiation erythema.

The incidence of photosensitivity to demethylchlortetracycline is not insignificant, and patients under treatment should be advised to avoid artificial sun lamps or direct sunlight, particularly, but not exclusively, during the summer months.

BIOPSY OF THE PARIETAL PLEURA

The results of needle biopsies of the parietal pleura in 42 patients and surgical biopsy of the pleura in 13 patients are reported in a paper by Shaw and Hallett (*Am. J. M. Sc.*, 241: 593, 1961). Diagnostic tissue was obtained in 26% of the needle biopsies and 46% of the surgical biopsies. One incorrect diagnosis was made from a needle biopsy. Needle biopsy of the parietal pleura was concluded to be a safe, rapid and accurate method of establishing an etiologic diagnosis in pleural effusions. The routine use of this technique at the time of the initial thoracentesis is recommended.

The finding of non-specific chronic pleuritis by needle biopsy does not eliminate the possibility of underlying tuberculosis or malignancy. If a diagnosis cannot be otherwise obtained, surgical biopsy of the pleura is recommended. Pleural biopsy augments, but does not replace, standard methods of examining pleural effusions. Diagnoses of "presumed tuberculous pleural effusion" and "idiopathic pleural effusion" no longer seem justified, in view of the ease and availability of pleural biopsy.

CORTISONE AND PHENYLBUTAZONE IN THE TREATMENT OF DIPHTHERITIC CROUP AND NON-DIPHTHERITIC STENOSING LARYNGITIS

The efficacy of the treatment of 63 cases of diphtheritic croup and 20 cases of non-diphtheritic stenosing laryngitis by administration of cortisone or phenylbutazone in addition to the classical treatment with antitoxic serum and antibiotics was assessed by Kasza and Csoz (*Rumanian M. Rev.*, 4: 41, Oct.-Dec. 1960). In 74.6% of the diphtheritic-croup cases, cortisone, 50 to 100 mg., was administered together with antitoxic serum and antibiotics; in most cases it was given only on the first day of treatment. In 13 patients (20.6%) cortisone, in the doses stated above, was given together with phenylbutazone, in a single dose of 10 mg. per kg. of body weight, intramuscularly, in addition to the antitoxic serum and antibiotics. Anti-inflammatory treatment was also given in the 20 cases of pseudo-croup or stridulous laryngitis with signs of laryngeal stenosis;

all these patients also received antitoxic serum and antibiotics.

The efficacy of the anti-inflammatory treatment was estimated by comparison of the results of this series with those obtained with classical treatment alone in 153 diphtheritic croup cases of similar age and severity.

It was found that the association of powerful anti-inflammatory drugs with the antitoxic serum and antibiotic treatment had a highly beneficial action on the course of diphtheritic croup: tracheotomy was required much less frequently (6.35% of cases); and the fatality rate was reduced to a minimum (1.59%), compared with 20.60% and 18.94%, respectively, in the control series. No tracheotomies were required, and no fatalities occurred in the 20 cases of non-diphtheritic stenosing laryngitis. The authors are of the opinion that the most favourable effect may be obtained by concomitant administration of cortisone and phenylbutazone, in addition to the classical treatment, in both diphtheritic croup and non-diphtheritic stenosing laryngitis.

THERAPY OF HYPOPLASTIC ANEMIA WITH BONE MARROW TRANSPLANTATION

McFarland *et al.* (*Arch. Int. Med.*, 108: 23, 1961) have reported the results of a three-year study to investigate the use of bone marrow transplantation as a therapeutic measure in hypoplastic anemia. Twenty patients with aplastic anemia were treated with infusions of homologous bone marrow, and their course was compared with the results obtained in 17 patients treated with measures other than marrow infusions. There were no differences found in the overall survival between the group treated with bone marrow and the "control" group.

Splenectomy had no discernible statistical effect on the survival of either group, but in three cases there was a dramatic effect occurring after splenectomy which had been performed approximately two weeks after bone marrow transplantation. Thus, the role of the spleen in the acceptance of a marrow graft remained uncertain.

Those patients who had received marrow from a donor who was a close relative appeared to respond significantly better than those who had received marrow from unrelated donors. The dose of marrow cells and route of administration (intravenously or directly into the medullary cavity) did not appear to be related to eventual recovery in the treated group. It was found that the use of high doses of corticosteroids in an attempt to allay the homograft reaction represented a genuine hazard to the leukopenic, aplastic patient with respect to the incidence of fatal infection.

Certain patients treated with bone marrow infusions derived both immediate objective hematologic effects and sustained benefits from this therapy. Some of these patients were apparently cured (two-year follow-up). The mechanisms of the immediate salutary effects occurring in some cases following marrow infusions were obscure.

It is concluded that, although the value of bone marrow infusions in the treatment of hypoplastic anemia is uncertain, there are sufficient indications of possible benefit to warrant continuation of the study.

(Continued on advertising page 40)

MEDICAL MEETINGS

TENTH INTERNATIONAL CONGRESS ON RHEUMATIC DISEASES - II*

SYMPOSIUM ON TREATMENT OF RHEUMATIC DISEASES

BOLAND (*Los Angeles*) discussed the influence of chemical structure on the antirheumatic potency of modified adrenocortical steroids as estimated by comparative studies of 33 synthetic analogues of cortisone and hydrocortisone in treatment of rheumatic arthritis, conducted over the past nine years. In general, when the following modifications are made individually, the antirheumatic potency of these steroids is increased greatly by fluorination at C9 and at C6; increased moderately by dehydrogenation at C1 and at C2; influenced variably by dehydrogenation at C6 and at C7; increased by methylation at C2; increased slightly by methylation at C6; influenced variably but not decreased by methylation at C16; decreased by methylation at C21; and decreased markedly by hydroxylation at C16 and by desoxygenation at C21. This author's original hope that information resulting from the compilation of such data might aid in predicting antirheumatic potency of new steroids has been only partially fulfilled because the various chemical modifications described often exert variable influences. Only rough estimates are justified from theoretical calculations, and the determination of antirheumatic potency continues to depend on laborious clinical trials. Current views about the structural requirements for anti-inflammatory activity of a steroid include: a 4-5 double bond in ring A; an oxygen atom at C3, C11 and C20; and a beta hydroxy grouping at C17. So far these features have been present in every steroid that has effectively suppressed inflammation, though not every steroid possessing them has proved to be active.

Additional investigations of the therapeutic efficacy of 13 recently developed halogenated corticosteroids observed in the treatment of rheumatoid arthritis were reported by ROBLES GIL and KATONA (*Mexico City*). The following products were found to have less anti-inflammatory potency than prednisone: (1) 6- α -chloro-cortisone, 3-enol-ether-21-acetate; (2) 6- α -chloro-9- α -fluoro-16- α -hydroxy-hydrocortisone-16, 17-acetonide acetate; and (3) 6- α -fluoro-16- α -hydroxy-prednisolone-16, 17-acetonide acetate. Four other compounds tested had the same potency as prednisone, or greater, namely (1) 6- α -fluoro-prednisolone acetate; (2) 6- α -chloro-6-dehydro-prednisone acetate; (3) 6- α , 9- α -difluoro-16- α -hydroxy prednisolone; and (4) 6- α , 9- α -difluoro-16- α -methyl prednisolone, which was one of the most active compounds studied. Two of the products investigated appeared to have some therapeutic advantage in the dissociation of their antiphlogistic and analgesic effects; these were (1) 6- α -chloro-prednisone acetate, which showed a marked topical anti-inflammatory effect; and (2) 6- α -chloro-6-dehydro-16- α -methyl-prednisone acetate, which had a greater analgesic than antiphlogistic effect. Two steroids with greater activity than prednisone appeared

to be especially suitable for long-term therapy: (1) 6- α -fluoro-16- α -methyl, prednisolone acetate (paramethasone acetate) and (2) 6- α -fluoro-16- α -methyl prednisone acetate.

Studies of 212 cases of severe, active rheumatoid arthritis during suppressive treatment with either corticosteroids or ACTH were reported by SAVAGE, COPEMAN *et al.* (*London*). One hundred and eight of these patients received oral corticosteroids for from one month to nine years and 104 were treated by ACTH for from one month to seven years. The two hormonal agents were compared on the basis of observations on the patients so treated, which included clinical measurements such as grip strength and point tenderness as well as work ability, urinary 17-hydroxy corticosteroid excretion, side effects and assessments of pituitary and adrenal reserve. The side effects were considerably different, dyspepsia being the most frequent with oral steroids while hypertension was the main complication with ACTH. Each of these methods of suppressive treatment had its advantages and disadvantages. While ease of administration, tendency to loss of beneficial effect and difficulty of withdrawal were more pronounced with oral corticosteroids, administration of ACTH involved the necessity for self-injection but this was associated with more accurate regulation of dosage and greater ease of withdrawal.

Experiences with dexamethasone administered orally to 21 rheumatoid patients for six to 27 months (average 22 months) were recounted by HOULI and MATHIAS FILHO (*Rio de Janeiro*). The 15 women and six men so studied ranged in age from 2 to 67 years and the duration of their disease ranged from one to 40 years. All had "classical", "definite" or "probable" rheumatoid arthritis in grades I, II or III (A.R.A. criteria). Dexamethasone dosage varied from 3 to 4 mg. per day as initial suppressive therapy, with progressive reduction to variable individual maintenance dosage of 1 mg. daily or on alternate days. Other conventional therapeutic measures were prescribed simultaneously. In general the favourable results of initial suppressive high doses were sustained with the lower maintenance doses; clinical improvement was paralleled by biochemical and other laboratory findings; and in no case was it necessary to discontinue treatment. Comparison of these cases with comparable controls led to the conclusion that dexamethasone therapy is effective in the long-term treatment of rheumatoid arthritis.

HOLLANDER, JESSAR and BROWN (*Philadelphia*) summarized their ten-year experience with intra-synovial steroid therapy which involved more than 100,000 corticosteroid injections into joints, bursae or tendon sheaths of over 4000 patients with various disorders. Microcrystalline suspension of hydrocortisone acetate was the preparation most commonly used. In cases where this was followed by only transitory relief, the use of hydrocortisone tertiary butyl acetate was associated with more prolonged palliation in more than half. Prednisolone tertiary butyl acetate produced a still longer duration of anti-inflammatory effect in rheumatoid and osteoarthritic joints. More recent observations indicate that triamcinolone acetonide tertiary butyl acetate is very effective for intra-articular therapy, particularly in joints responding poorly to other

*Part I of this report was published in the previous issue of this Journal—*Canad. M. A. J.*, 85: 901, 1961.

steroids. Such treatment is, of course, only useful for local and temporary palliation but, in conjunction with proper supportive and systemic measures, has proved valuable in the long-term management of troublesome rheumatoid or osteoarthritic joints and has enhanced rehabilitative and orthopedic procedures. While it does not halt the advance of the underlying disease, these workers noted no evidence that it accelerates disease progression. Of the various disabilities so treated the results were least encouraging with osteoarthritic hips. Adverse effects observed included transient local exacerbations after injection; septic (staphylococcal) arthritis, in less than 1 per 7000 joint injections; and increased instability in repeatedly injected weight-bearing articulations in 37 joints (an incidence of 0.7%), with radiological evidence of articular bone absorption (aseptic necrosis) in some. It was concluded that intrasynovial steroid therapy has proved its usefulness as a temporary, palliative, repeatable local adjunct in treatment of a variety of rheumatic conditions. While not without risks, adverse effects are relatively rare. Care in injection technique and continued observation of patients is necessary. Weight-bearing arthritic joints should be protected against undue trauma or excessive use while being subjected to repeated injection therapy.

A series of papers dealt with the undesirable side effects and complications of corticosteroid therapy. STRANDBERG (*Copenhagen*) reported the observation of peripheral myopathy in 5.8% of 86 rheumatoid patients treated with triamcinolone and subjected to clinical, electromyographic and biopsy studies, routine biopsies being taken from the biceps brachii. The mean period of triamcinolone therapy was six months and the mean dose was 8 mg. per day. The same characteristic picture of peripheral myopathy was, however, also observed in a rheumatoid patient who had never received corticosteroid treatment. The following questions were posed for further investigation: Is the frequency of peripheral myopathy greater in rheumatoid patients treated with fluorinated steroids than in those receiving other steroids? If so, do the benefits that may be reasonably expected from such treatment outweigh this risk? Does peripheral myopathy occur more frequently than heretofore recognized in the natural course of rheumatoid arthritis untreated by corticosteroids or is it activated during treatment with such drugs, particularly the fluorine-substituted steroids?

FREYBERG and CASCON (*New York*) presented an assessment of the problem of pathological fractures in rheumatoid patients on long-term corticosteroid therapy. Records and radiographs of some 300 rheumatoid patients who had received continuous corticosteroid treatment for longer than six months were compared with those of (1) 100 rheumatoid patients who had never received corticosteroids and (2) 100 non-arthritic clinic patients with complaints suggesting fracture, who had never received corticosteroids. Of the corticosteroid-treated rheumatoid arthritics, 12% had clinically important fractures of osteoporotic bones. None of these had unrelated diseases that could be responsible for osteoporosis. Eighty-two per cent of the fractures were compression fractures of vertebral bodies; 16% were in ribs; only 2% affected long bones; and in the majority, fractures were multiple. The dorsal spine was the site of 56% of the vertebral compressions and the lumbar spine of 44%; none occurred in the

cervical spine. Ninety-two per cent of the steroid-treated rheumatoid patients with fractures were women, 96% of whom were post-menopausal. In comparison, no fractures were observed in the group of 100 rheumatoid arthritic patients who had never received corticosteroids. This group was comparable to the steroid-treated series except that the arthritis was generally less severe. It was concluded that unless an antirheumatic corticosteroid devoid of important catabolic effect is developed, this serious complication of prolonged treatment will continue to be frequently encountered if the catabolic steroid effect cannot be compensated. This is an important prophylactic problem that should always be considered when the patient to be treated has severe rheumatoid disease, is over 45 years of age, and is a woman. A completely satisfactory "anabolic" regimen has not yet been devised.

An increase in the frequency of destructive lesions of cartilage and subchondral bone in the hip joints of rheumatoid patients during the past 10 years, as compared with the frequency of such lesions before 1950, was considered by EDSTROM (*Lund, Sweden*) to reflect the long-term effects of corticosteroid therapy. Such changes are characterized radiologically by erosion and destruction of the femoral head, frequently very severe and extensive, and sometimes accompanied by protrusio acetabuli. Clinically these findings are associated with severe pain on movement, ankylosis, limp and contractures. It was postulated that corticosteroids contribute to development of these changes (a) through their anti-anabolic effect which accentuates osteoporosis and (b) because the relief of pain pursuant to their administration permits excessive use and undue trauma of an already damaged joint.

A sweeping denunciation of all forms of corticosteroid treatment of rheumatoid arthritis was delivered by KELLY (*Melbourne, Australia*).

FORESTIER *et al.* (*Aix-les-Bains, France*), on the basis of a comparative study of long-term treatment of "chronic evolutive polyarthritis" (rheumatoid arthritis) by gold therapy and by hormone therapy, considered that gold salts are still particularly useful and effective therapeutic agents in the treatment of this disease. These workers reported that 435 patients treated by means of gold salts at various stages of their disease, throughout a 1-20 year period of follow-up, all showed a lesser degree of disease severity and better functional capacity than before such treatment was instituted. Despite these favourable features, however, anatomical and radiological changes progressed or at least were not prevented by gold therapy. These therapeutic results were contrasted with the dramatic early effects and remissions induced by corticosteroid therapy, which are, however, offset by the relatively high proportion of serious side effects and difficulties encountered in continuing such therapy on a long-term basis in a large proportion of cases. As far as mortality was concerned, among the 435 cases in the series of these authors, treated by gold, two deaths were attributed to treatment. This was compared with 26 deaths due to treatment among 385 patients treated by corticosteroids as described by others in the literature.

In two separate reports, STANOJEVIC *et al.* (*Belgrade*) and REICHER and REIPERT (*Warsaw*) advocated the use of a preparation called "Resochine" as a valuable addition to therapy of rheumatoid arthritis. The nature of this agent was not elucidated in these reports. The

patients described by Reicher were young girls with juvenile rheumatoid arthritis. She expressed the opinion that in such cases the most effective form of therapy is a combination of dexamethasone and "Resochine", together with a conventional treatment regimen, individual and group psychotherapy and an intensive and prolonged comprehensive rehabilitation program. Stanojevic observed that in most cases of adult rheumatoid arthritis long-term control of the disease could be maintained by "Resochine" alone after an initial period of suppressive therapy during which this drug was administered together with other agents such as aspirin, gold salts, phenylbutazone and corticosteroids.

Observations on the long-term continuous use of phenylbutazone for periods of one to eight years in 1002 patients with a variety of chronic musculoskeletal disorders were reported by EHRLICH, BERKOWITZ and STEINBROCKER (*New York*). When beneficial effects were experienced with the initial administration of this drug they were usually analgesic in nature; generally speaking, such benefits were retained during the period of long-term administration of the drug, essentially with the same degree of effectiveness. In the experience of these authors, patients stop taking phenylbutazone because of toxicity, failure to retain functional benefits, refusal of supervision, or demand for treatment by more active agents. In general, toxic manifestations noted early during administration of this compound were also encountered during its long-term use. Disturbances of water balance and gastrointestinal and genitourinary side effects were all encountered with long-term therapy, throughout which the potential for hematopoietic disturbances also persists. Patients with rheumatoid arthritis who continued to take phenylbutazone over a long-term period did so even with minor-grade benefits, and these patients were considered to represent a "therapeutic survival" mainly because of the analgesic effects of this drug. Patients with ankylosing spondylitis were able to tolerate phenylbutazone well and derived substantial analgesic and functional benefits from its use, and such benefits were maintained during the period of long-term administration. It was felt that this drug offers a useful form of therapy for ankylosing spondylitis, particularly when pain is a prominent symptom. No increase in frequency of toxic manifestations was noted among the patients with degenerative joint disease treated with this drug despite the fact that these patients were generally in the older age groups. Of 320 patients with degenerative joint disease as the definite basis of pain and disability who were started on phenylbutazone, 118 continued to take the drug for periods between one and eight years. Of 63 patients with acute and chronic gout who were started on this drug, 24 continued to take it for more than a year. It did not prevent recurrences of acute gouty attacks in these patients. It was concluded that the benefits from phenylbutazone in rheumatoid arthritis and other disorders treated for a long period of time are mainly in the nature of analgesia. Such benefits are not inconsiderable, and the drug has distinct merits for those patients who are able to tolerate it initially and to continue to use it for a long period of time.

MISCELLANEOUS SUBJECTS

An impressive, well-illustrated discussion of the natural course of the arthropathy in patients with alcaptonuria was presented by SITAJ, HUTTL and KOSTKA (*Pistany, Czechoslovakia*). Based on studies of more than 200 alcaptonuric individuals and 29 families (which must be one of the most extensive series of cases of this disorder on record), these workers distinguished three types of alcaptonuria, which probably reflect varying degrees of deficiency of the enzyme homogentisicase. The first two types are manifested by excretion of homogentisic acid in the urine which may be persistent ("true alcaptonuria"), or intermittent, superimposed upon excretion of an alcaptonogenic substance, such as tyrosine ("potential alcaptonuria"). The third type, the most serious from the clinical and prognostic point of view, is probably due to total, or almost complete, absence of the enzyme. In this type, homogentisic acid is polymerized to nitrogenous pigment (ochronotic melanin) which infiltrates connective tissues particularly rich in collagen, such as tendons and fibrous cartilage, colouring them bluish-brown or black (ochronosis). This is associated with development of an arthropathy of degenerative nature. The clinical and radiological features of this arthropathy were described and illustrated in detail. Similarities and differences between this arthropathy and "simple osteoarthritis" were emphasized. It affects electively three specific articulations, the knee, the hip and the shoulder, sparing the distal interphalangeal articulations of the hand. In the knee, effusions are common and the depolymerization of hyaluronic acid is accentuated. One-third of the patients developed disabling "osteoarthritis" of the hip. In advanced phases of the disease, an osteochondromatous reaction of the knee and shoulder is the rule. Calcification of intervertebral discs with massive and multiple ossifications in the region of tendinous insertions is a typical and almost pathognomonic feature of ochronotic osteoarthritis. Ochronotic discopathy is usually evident radiologically by the third decade and is manifested by narrowing and calcification of the intervertebral spaces generally located in the thoraco-lumbar region, occasionally followed by a variable degree of fusion of adjacent vertebrae and voluminous osteophyte formation. Changes resembling those of "ankylosing hyperostosis" or of "anterior spondylitis" may be encountered. While ochronotic lesions affect connective tissue in a variety of organs, the arthropathy is the most important manifestation in the overall clinical picture.

VON ALBERTINI and BONI (*Zurich*) described an unusual form of naturally occurring polyarthritis observed in swine in Switzerland, with clinical features resembling those of rheumatoid arthritis in man. Multiple joint swelling, calcification of articular capsules and a high hemoglobin concentration in the blood were noted in this disease, which affected animals between two and seven years of age. Microscopically the joint capsule was swollen and lamellated, the tendon sheaths were thickened and swollen, and the affected tissues infiltrated by inflammatory cells with areas of necrobiosis in some sections. Varying phases of progression of the degenerative and necrotic changes were evident in different areas. Articular cartilage and bone erosion was accompanied by disruption of collagen-containing tissues which were infiltrated by fibrin. Many arteries and veins in affected areas showed a destructive necrosis.

The biochemical and physical characteristics of the various connective tissue elements were reviewed in detail by HARTMANN (*Marburg, Germany*), who described the results of studies of experimentally induced pathological states in the connective tissue of rats. These investigations, together with studies of human "rheumatic" connective tissue, led to the following observations. During stages of acute inflammation large amounts of soluble collagens, glycoproteins and acid mycopolysaccharides appear, the representative micropolysaccharide at this stage being a hyaluronic acid of a low degree of polymerization. The physical characteristics of such tissues are low solidity, increased elasticity, high water content, high diffusibility and increased permeability. The metabolism of connective tissue cells which are present in large numbers is increased as demonstrated by a high degree of incorporation of S^{35} . Fibrils formed at the end of this acute inflammatory stage are of reticular nature, with a low degree of differentiation. These connective tissue changes are non-specific and may be observed after injection of a bacterial pyrogen. They may develop further along three possible pathways: (1) repair through reabsorption, (2) connective tissue destruction or (3) loss of physiological differentiation and formation of scar which usually has the structure and properties of a tendon. The morphologic substrate of connective tissue destruction is so-called "fibrinoid degeneration" in which the x-ray diffraction pattern shows loss of macromolecular order similar to that in swollen collagen fibres exposed to acid or alkali. The electron microscopic picture shows a peculiar "rope ladder-like" transformation. The different staining characteristics of the fibrils with uranyl acetate and osmium tetroxide indicate a change in their surface structure. Finally, the fibrils become fragmented, the connective tissue loses its solidity and elasticity, and its shrinkage temperature decreases. This sequence of events can be demonstrated in rheumatoid nodules and damaged articular cartilage from patients with rheumatoid arthritis. Similar fibrils with altered solubility, marked fragility and decreased shrinkage temperature can be produced in a medium containing globulins, bacterial polysides, tryptic enzymes or substances capable of splitting hydrogen bonds. Scar formation begins with an increase in chondroitin sulfate and a concomitant decrease in hyaluronic acid and soluble collagen, the connective tissue becoming drier with loss of turgor and elasticity. The fibrils increase in number, degree of differentiation, thickness and density. Loss of diffusibility, permeability, elasticity and transparency is associated with impairment of connective tissue function, as in the stiffened rheumatic heart valves. In chronic rheumatic inflammation the most important feature is the shrinkage of connective tissue fibres in joint capsules and heart valves. Since shrinkage depends on the temperature, it is assumed that in chronically inflamed connective tissue the critical temperature of shrinkage decreases to the level of body temperature. In this respect, loss of hydroxyproline, splitting of hydrogen bonds, tryptic digestion, certain changes in the milieu of intercellular ground substance, inflammation of surrounding tissues and inactivity are all factors that result in a decrease of the shrinkage temperature of connective tissue. Such changes in thermoelasticity, however, only serve as an indicator of the changes in the mechanical properties of connective

tive tissue whose macromolecular structure has been altered by "rheumatic" processes.

NESTEROV and SACHKOV (*Moscow*) presented a detailed account of studies designed to elaborate laboratory techniques of specific diagnostic value in rheumatic fever and "other collagen diseases". They expressed the view that in the serum of patients with these disorders there exists not only an antigen that is common to the entire group of "collagen diseases" but in addition an antigen specific for rheumatic fever and for each of the other individual disorders in this group. Proceeding from this hypothesis, they developed a laboratory procedure which they considered to be of specific value in the diagnosis of the individual disorders of the "collagen disease" group. This procedure involves the serological reaction between a "diagnostic rabbit anti-serum" and the patient's gamma globulin, which is demonstrated by paper immunoelectrophoresis. These authors expressed the opinion that further intensive studies of serum protein antigenic properties along these lines may lead to more clear-cut differentiation of the immunological characteristics of various "forms and stages of rheumatic fever" and other collagen diseases which, in conjunction with the clinical picture, may contribute to greater diagnostic accuracy.

A "two-phase cellular theory" of the pathogenesis of amyloidosis was advanced by TEILUM (*Copenhagen*), who presented experimental data in support of the concept that the process of amyloid formation in the tissues depends on a "biphasic development in the protein synthesizing function of mesenchymal (reticuloendothelial) cells". (1) The *active (pyrinophilic) phase* is characterized by proliferation of pyrinophilic reticuloendothelial cells and plasma cells and increase in serum gamma globulin. (2) The *amyloid phase* depends on suppression of such proliferating pyrinophilic mesenchymal cells associated with a fall in serum gamma globulin and a rise in alpha-2 and beta-2 globulin fractions. The transition from the initial, active phase to the amyloid phase may follow protracted stimulation of immune mechanisms as in a naturally occurring disease or may be enhanced experimentally by administration of cortisone or nitrogen mustard. Amyloid production is thus traced back to a cytochemically well-defined phase of dysfunction in the synthesis of proteins by reticuloendothelial cells, linked with the appearance of a PAS (periodic acid-Schiff) positive substance in their cytoplasm which is evident in the late active (pyrinophilic) stage and the early stage of intensive amyloid production. These cells are considered to be the primary source of amyloid formation. Pyrinophilic reticuloendothelial cells are concerned with the production of serum globulins (and antibodies) in response to antigenic stimuli, and the breakdown of this function in the face of persistent antigenic stimulation results in the local precipitation of amyloid. The clinical manifestations of amyloidosis are largely determined by the state of exhaustion of protein synthesis by reticuloendothelial cells associated with a transitory secretion of a glycoprotein which is laid down locally and constitutes the main component of amyloid. Teilum thus rejected previously published suggestions that amyloid is precipitated from the blood stream, that it is simply a secondary result of hyperglobulinemia, and that a dysproteinemia is the primary and humoral basis for amyloid deposition. The author's two-phase cellular theory of pathogenesis was correlated to the amyloidosis induced experimentally by cortisone, nitro-

gen mustard, x-irradiation and experimentally induced scurvy, and to that observed in rheumatoid arthritis patients with or without corticosteroid therapy, in patients with Hodgkin's disease or Hodgkin's sarcoma treated by nitrogen mustard, and in individuals with agammaglobulinemia or hypo-immuno-globulinemia. Teilmann expressed the opinion that a consideration of the cellular phases in reticuloendothelial tissue, related to hyperimmunization and affected by such substances as cortisone, ACTH, nitrogen mustard and ascorbic acid, which are known to affect other aspects of connective tissue function, may contribute to clarification of many of the inconsistencies inherent in earlier theories and help to open new fields of investigation in relation to amyloidosis.

A clinico-pathologic study of renal amyloidosis in rheumatoid arthritis and related disorders was reported by BAYLES, CORSON and HOLDSWORTH (*Boston*). A review of 5052 autopsy records extending over the period 1914-1960 revealed 80 cases of rheumatoid arthritis, 16 of ankylosing spondylitis and 10 of juvenile rheumatoid arthritis. Eleven of the 80 rheumatoid cases had secondary amyloidosis with renal involvement and in four of the 11, death was due to uremia. Four of the 16 cases of ankylosing spondylitis had secondary amyloidosis and of these, three had amyloid involvement of the kidney and two died in uremia. Six of the 10 juvenile rheumatoid arthritis cases had secondary amyloidosis; in five there was renal involvement and in four of these uremia was the cause of death, the fifth dying of a cerebral hemorrhage subsequent to severe hypertension and renal insufficiency. The incidence of secondary amyloidosis in these 106 autopsied cases was therefore 19.8% (21 of 106 cases), and renal amyloidosis was demonstrated in 19 of these 21 cases. Details of the clinical and pathological features of the 11 patients who died of uremia or its complications and whose autopsy studies revealed renal amyloidosis (four with rheumatoid arthritis, two with ankylosing spondylitis, and five with juvenile rheumatoid arthritis) were discussed. Hypertension of some degree was noted in nine of these 11 patients and was more prominent in those with juvenile rheumatoid arthritis, in all cases occurring relatively late in the course of the disease. Acute pyelonephritis was present in two cases at some stage in their illness and was the only early clinical manifestation of renal disease. The nephrotic syndrome was definitely present in one case and probably in three others. Moderately severe anemia was present in four juvenile rheumatoid arthritis cases at the onset of their disease, and all 11 patients developed a severe anemia associated with their terminal renal insufficiency. Serum albumin was decreased in all who had serum protein estimations. In 10 subjected to a Congo red test there was 100% retention of the dye by the tissues in seven, 70-90% retention in two and 57% retention in one. Open renal biopsy demonstrated the presence of amyloid in one case. In another a gum biopsy was normal at a time when 100% of injected Congo red was retained by the tissues. In all 11 cases abnormal amounts of leukocytes, erythrocytes and casts were noted in the urine at some time during the course of their renal involvement, usually associated with the onset of albuminuria. Tests of renal function, usually performed after the onset of albuminuria, and determinations of 24-hour urinary albumin were abnormal in the majority of cases. Persistent albuminuria was the first indication of renal disease. In 10 of the 11 cases

this prompted investigation for the presence of amyloid disease; in the eleventh this investigation was prompted by marked hepatosplenomegaly. In 10 of the 11 cases the duration of the rheumatic disease prior to the onset of albuminuria and diagnosis of amyloidosis ranged from two to 29 years (average 14.1 years). Duration of life following the diagnosis of renal amyloidosis in rheumatoid arthritis, ankylosing spondylitis and juvenile rheumatoid arthritis was 2, 4, 9 and 10 years; 6 and 9 years; and 3, 4, 8, 13 and 13 years, respectively. At autopsy, renal amyloidosis was severe in eight cases and slight or moderate in three. Those who had had acute pyelonephritis showed thickened adherent renal capsules with a finely granular renal surface; in the others the kidneys were usually contracted, small and with uniformly thinned cortices. Amyloid predominantly involved the glomeruli and to a lesser extent the blood vessels, tubular basement membranes and interstitium. Vascular amyloid involvement was predominantly but not entirely confined to small arteries and arterioles, but in some cases affected large arteries or even veins and capillaries. In about half the cases histologic features suggestive of acute pyelonephritis were observed, in some instances associated with necrosis and abscess formation. There was no difference between the three rheumatic diseases specified in this study as far as degree, extent or location of renal amyloid deposits was concerned. The clinical activity of the associated rheumatic disease varied greatly in these 11 cases, but on the whole the findings in this small group suggested that the development of amyloid disease secondary to such chronic inflammation is probably dependent not only on the duration of the inflammatory process but also on its intensity.

STOIA (*Bucharest*), in a report of hepato-biliary disturbances encountered in patients with various "rheumatic" disorders, noted that focal necrotic lesions in the liver, hepatomegaly and abnormal liver function tests are present in an appreciable proportion of children suffering from rheumatic fever with cardiac involvement. The degree of liver involvement in such cases was not necessarily related to the state of rheumatic activity. Variable manifestations of hepatic pathology were encountered in patients with "chronic evolutive polyarthritis" (rheumatoid arthritis). These manifestations included vague right upper quadrant abdominal distress and anorexia, anicteric fatty degeneration of the liver, impairment of liver function without other evidence of hepatic disease, hepatic parenchymal necrosis, reticular hyperplasia and hepatomegaly. Acute and chronic hepatic, pancreatic and splenic lesions were said to be not uncommon in other "collagen diseases" such as ankylosing spondylitis, polyarteritis nodosa, dermatomyositis, scapulo-humeral peri-arthritis, osteoarthritis, "fibrositis" and other forms of "chronic rheumatism". In view of these observations it was emphasized that the need for recognition and treatment of these hepato-biliary disorders should not be overlooked in such patients whose primary manifestations are those of articular or musculoskeletal disease. Unfortunately the English translation of this and several other papers detracted from the clarity of their presentation.

These difficulties in translation were also evident in the report presented by BOSSA (*Naples*) concerning the relative frequency of concurrent or complicating "rheumatic" ailments during the course of diabetes mellitus. It was noted that diabetics suffer from a

greater than expected incidence of "osteoarthritis" and "peri-arthritis", the so-called degenerative forms of joint disease. These disorders did not correlate with the severity of the diabetes, unlike osteoporosis which was also encountered with relatively high frequency but which appeared to parallel the severity of diabetes. Reference was also made to the now well-recognized syndrome of neuropathic arthropathy in diabetes. The discussion of this paper raised the question of a possible role of insulin antagonists, particularly pituitary growth hormone, in the pathogenesis of the "degenerative" forms of joint disease as well as other complications of diabetes.

Observations on the various manifestations of neuritis encountered in patients with rheumatoid arthritis and gout were presented by ARLET *et al.* (Toulouse, France). Mononeuritis or bineuritis most commonly affected the median nerve at the wrist owing to its compression within the carpal canal (the "carpal tunnel syndrome"). Five of 15 patients with this syndrome required open operation to decompress the median nerve. A comparable "cubital tunnel syndrome" due to compression of the ulnar nerve between the diseased elbow joint and the overlying aponeurotic origin of the flexor capri ulnaris was noted in one case. Compression of the larger nerves at knee level was also described. When polyneuritis occurred, it most commonly affected the distal segments of the extremities and was at times ushered in by extremely acute pain followed by motor manifestations. Polyneuritis in these cases was frequently associated with local areas of arteritis and superficial patchy necrosis of the skin and subcutaneous tissues overlying such arterial lesions. In one case this type of lesion was also accompanied by coronary arteritis. These authors listed the causes of peripheral nerve involvement in patients with rheumatoid arthritis and gout as (1) inflammatory perineuritis, (2) arteritis with involvement of vaso nervorum, and (3) compression of a peripheral nerve or

nerves in areas of confined space bounded by unyielding tissues, usually associated with inflammatory soft tissue swelling due to synovitis or tenosynovitis. The importance of recognizing these forms of compression neuritis was stressed because such lesions can, if indicated, usually be treated satisfactorily by surgical procedures to relieve the compression factor.

In addition to the presentations in the plenary sessions and the symposia that provided the basis of the foregoing report, a wealth of significant contributions emanated from the 383 papers presented in the multiple sessions that were conducted concurrently in 14 individual meeting halls. The following reports from Canadian contributors were delivered at these sessions:

Sensitized Sheep Cell Reaction Patterns in Rheumatoid Arthritis—N. A. HINTON and H. G. KELLY, Kingston.

Functional Assessment in Rheumatoid Arthritis—H. S. ROBINSON, Vancouver.

Inflammation and the Anti-Inflammatory Drugs in the Rheumatic Diseases—WALLACE GRAHAM, Toronto.

Precordial Chest Pain and Cervical Osteoarthritis—J. N. SWANSON, Toronto.

As observed at the beginning of this report, it has been possible to touch but superficially upon the highlights of portions of a concentrated program that encompassed a massive compilation of data collected from all regions of the world. In keeping with the experiences of others who have attended international medical conferences of this type, it was abundantly evident that when scientific investigators meet for frank discussions of their common interests, problems and accomplishments—political ideologies, national prejudices and iron curtains seem to disintegrate (if one may be permitted to scramble a simile) like collagen fibres in a medium of concentrated tryptic enzymes.

DONALD C. GRAHAM

ASSOCIATION NOTES

ADDENDUM TO THE TRANSACTIONS OF THE 94TH ANNUAL MEETING

The Executive Committee has authorized the following additions and amendments to the Transactions of the 94th Annual Meeting as published in the September 2, 1961 issue of the Journal.

After para. 47

Moved by Dr. W. D. Whyte,
seconded by Dr. G. W. Mylks,

BE IT RESOLVED that Sections 46 and 47 be received for information as the opinion of the Special Committee on Prepaid Medical Care but that General Council limit its action at this meeting to agreeing that the insurance coverage for the Canadian public should be broadened in the fields of benefits covered and the people insured as rapidly and expeditiously as possible.

Carried

After para. 64

The disposition of the report of the Special Committee on Prepaid Medical Care should read as follows: "The Report of the Special Committee on Prepaid Medical Care as amended, was adopted and referred back for further study."

After para. 74 add

It was moved by Dr. Bruce-Lockhart,
seconded by Dr. Nathan,

BE IT RESOLVED that a statement and explanation of the terms of reference and powers and limitations of the C.M.A. Executive Sub-Committee on Health Services be given for the information of delegates to the General Council.

Carried

and

BE IT FURTHER RESOLVED that the respective areas of jurisdiction of the C.M.A. and the Divisions be a subject of urgent study and report to the Divisions.

In response to the first portion of this resolution, Dr. G. E. Wodehouse, Chairman of the Executive Sub-Committee on Health Services, reported on the formation, the powers, the limitations and the activities of his Committee. He assured the General Council that the Sub-Committee regarded itself as responsible to the Executive Committee in all respects, that it had and would undertake the widest consultation possible, that it planned to proceed with the full knowledge and co-operation of the Divisions and that only when faced by a most urgent situation would it exercise the powers to speak for The Association without the benefit of prior consultation. At the conclusion of his statement Dr. Wodehouse was afforded an ovation and, when put to a vote, the second portion of the above resolution was lost.

After para. 104 add

The Honorary Treasurer tabled The Association budget for the year 1961 and advised all members of the General Council that copies for their perusal were available in mimeographed form.

APPOINTMENT OF MR. TOM WELLS

The Canadian Medical Association is pleased to announce that on October 10, 1961, Mr. Tom Wells of Toronto joined the organization as Advertising Manager—C.M.A. Publications.



Mr. Tom Wells

Mr. Wells is no stranger to this field, having had 10 years' experience in contacting firms and agencies concerned with medical advertising. He looks forward to having the pleasure of personal contact with our advertisers and their agencies.

T. C. ROUTLEY

OBITUARIES

DR. MARY A. RUNNELLS BIRD, one of Canada's first women medical practitioners, died August 31 at her home in Hudson, Que., at the age of 91.

Born in Milton, Que., Dr. Bird entered Bishop's Medical School in Montreal after graduating from Granby Academy. In 1900 she graduated with one other woman and seven male students. In 1905, the medical school was absorbed by McGill University and she was eventually granted a McGill degree, despite the fact that McGill did not, for a long time, recognize women students.

During World War I, Dr. Bird became house surgeon at Eggington Hall Hospital. After the war, she became assistant medical officer of health and child welfare in the city of Derby. On returning to Montreal with her husband, Dr. Bird joined the staffs of the old Montreal General Hospital and the Child Welfare Clinic and served as attendant doctor at the Y.W.C.A.

Dr. Bird is survived by two brothers and one sister.

DR. RONALD H. BLACKSTOCK, aged 30, died in St. Joseph's Hospital, Toronto, on July 2. He was a graduate of the University of Toronto.

He is survived by his widow and a brother.

DR. WILFRED CHRISTIE, 58, who had been coroner of East York since 1940, died August 10 at the Toronto East General Hospital after a brief illness. Born in Port Elgin, Dr. Christie graduated from Queen's University in 1932 and interned at the Toronto East General Hospital for two years. He was a past president of the Toronto East Medical Association and an associate on the staff of the Toronto East General Hospital.

Predeceased by his wife, Margaret Bernice, he is survived by two daughters and a son, and two brothers and three sisters.

DR. JOHN E. de BELLE, former executive director of the Montreal Children's Hospital, died on August 12, at the age of 60. Born in London, England, he came to Canada in 1912. After graduating in medicine at McGill University, he became medical assistant to the supervisor of the Royal Victoria Hospital. In 1937, Dr. de Belle was appointed general superintendent of the Children's Memorial Hospital, where he remained until his death, except between 1941 and 1945 when he was a surgeon commander with the Royal Canadian Navy. Upon returning to the hospital after the war, he became executive director. He served on the boards of the American Hospital Association, the Canadian Hospital Association, the Montreal Hospital Council, the Canadian Physiotherapy Association and the Cancer Aid League. Dr. de Belle was a Fellow of the American College of Hospital Administrators and a member of the Medical Society of Health of England.

He is survived by his widow and two sons.

DR. FRED J. GRANVILLE, 55, immediate past president of the Nova Scotia Medical Society and a prominent Stellarton, N.S., physician, died at Aberdeen Hospital, New Glasgow, N.S., on September 19, 1961.

Born in Halifax, Dr. Granville received his early education in that city and graduated in 1933 from

Dalhousie University Medical School. After serving on the staff of the Camp Hill Hospital, Halifax, N.S., for one year, he went to Stellarton to join the late Dr. George W. Whitman in medical practice, and he took over the practice on Dr. Whitman's death in 1939.

Dr. Granville was past president of the Nova Scotia Division, College of General Practitioners of Canada, and the Pictou County Medical Society, and was a member of the Provincial Medical Board. During the Second World War he served in the Reserve Army.

Dr. Granville is survived by his widow, three daughters, and two sons.

DR. VICTOR LAPP, 74, died at Hamilton, Ont., on September 21, 1961. He was born in Cobourg, Ont., and graduated from McGill University in 1921. He served a one-year internship at the Hamilton General Hospital, and then joined the MacGregor Clinic in Hamilton. In 1923 he went to the Mayo Clinic for a postgraduate course and then returned to the MacGregor Clinic, where he practised until his retirement. During the First World War he served in the artillery.

He is survived by his widow, and by two sons who practise medicine in Hamilton.

DR. D. P. LYNCH died on August 10, in Almonte, Ont., after a brief illness. Born at Chapleau, Dr. Lynch received his medical degree at Queen's University. He had practised medicine in Almonte for 30 years.

DR. W. D. McPHAIL, 65, died at Rochester, Minn., on September 20, 1961. He was born in Manitoba, and graduated from the University of Manitoba in 1925.

He practised first at Kindersley, Sask., for some years and then went to Saskatoon. He served in both world wars in the Air Force, and was well known in amateur hockey circles.

Dr. McPhail is survived by his widow and a daughter.

DR. STEPHEN MORTON, aged 44, died at his home in Port Arthur, Ont., on August 31. A native of England, Dr. Morton came to Canada in 1953 to the Hospital for Sick Children in Toronto. A year later he went to Port Arthur, where he was chief of pediatrics at St. Joseph's Hospital.

He is survived by his widow and two sons.

DR. RUPERT F. SEAMAN, a well-known Charlottetown doctor, died August 17, at the age of 71. Dr. Seaman, who received his education at Prince of Wales College and McGill University, was one of the first doctors connected with the Polyclinic in Charlottetown.

He is survived by his widow and one son.

DR. JOHN CLAYTON SQUIRES, 40, died at Weyburn, Sask., on September 16, 1961.

Born in Corinne, Sask., Dr. Squires graduated in medicine from the University of Manitoba in 1952. He served an internship at Regina Grey Nuns' hospital, and established his practice at Weyburn nine years ago.

Dr. Squires is survived by his widow and a daughter.

BOOK REVIEWS

CEREBRAL ANOXIA AND THE ELECTROENCEPHALOGRAM. The Proceedings of the Marseille Colloquium. Edited by Henri Gastaut and John Stirling Meyer. 617 pp. Illust. Charles C Thomas, Springfield, Ill., 1961. \$24.50.

This volume consists of a series of papers and discussions presented as a colloquium in Marseille, France, in October 1959.

In spite of a forbidding title this book should be of interest to all medical persons whose interest lies in the cerebral circulation. It is an important volume, because it gives the current opinion and experience of the European workers. Although the colloquium was held under the auspices of the European electroencephalographers, the emphasis is clinical. This differs from the usual approach of American electroencephalographers who favour pure neurophysiology at the expense of clinical material. For this reason the title is a little unfortunate, for it may discourage some who should read it.

All aspects of the cerebral circulation were presented in this colloquium. The first third of the volume deals with laboratory studies, including biochemical and pathological studies of human brains. The remainder of the volume is clinical in its approach. There is a discussion of the electroencephalographic signs produced by transient hypoxia and the value of this as a diagnostic procedure. Several papers are devoted to the use of the electroencephalogram as a monitor of the efficacy of the extracorporeal pumps in cardiac surgery. Almost a third of the volume is devoted to studies of cerebral ischemia occurring spontaneously in Stokes-Adams attacks or induced mechanically by carotid compression or reflexly through the carotid sinus or ocular compression.

It is a rewarding volume to read, since many of the authors have a different approach from that usually presented on this continent.

ANATOMY OF THE EYE AND ORBIT. Including the central connections, development, and comparative anatomy of the visual apparatus. 5th ed. Revised by R. J. Last. 500 pp. Illust. W. B. Saunders Company, Philadelphia; MacAinsh and Company Limited, Toronto, 1961. \$18.00.

The fifth edition of this standard text has maintained the high quality of the previous volumes. Two things which are particularly striking and particularly helpful are the excellent illustrations and the careful organization of all the material in the volume. It is possible to find what one might be interested in, to see it illustrated and to appreciate it in relation to the neighbouring structures.

This book can be considered pre-eminent as an anatomical text for the ophthalmologist. Recently, there has been a great flood of new material, particularly by the production of three-dimensional models and through electro-microscopy. Despite this work as a basic text, Wolff's book still is without a rival. It is likely that a separate text must be written to give the new anatomy and microscopy which is currently being discovered.

SIXTH INTERNATIONAL CONGRESS OF RADIOLOGY. Vols. 1 and 2. Transactions, Munich, July 23-30, 1959. Edited by B. Rajewsky. Vol. 1, 800 pp. Vol. 2, 1625 pp. Illust. Georg Thieme Verlag, Stuttgart, W. Germany; Intercontinental Medical Book Corporation, New York, 1961. \$60.00.

This publication is in two volumes, each of some eight hundred pages. Some nine hundred papers were presented at the Congress and the two volumes of the "Transactions" contain all the papers which could be gathered together for publication in this book. Papers which could not be obtained in original form are published as abstracts from the "Book of Abstracts" of the Congress.

The program was divided into six parts: Diagnostic Radiology, Therapeutic Radiology, Nuclear Medicine and Therapy with High Energy Radiation, Radiobiology and Biophysics, Danger Posed by X-rays and X-ray Protection, Physics and Technique, Training and Research, Legal Aspects and Laws Concerning Radiology. Almost half of the papers were given in German, somewhat more than a quarter were given in English, and the remainder of the papers were in French and in Spanish. The published volumes follow this proportion. A large number of the articles are in German and to obtain the greatest value from this book one should be able to read that language. The material contained in these two volumes is excellent, the illustrations are very fine and the two volumes represent the summation of world radiological thoughts as of mid-summer of 1959. A number of the articles contain extensive bibliographies which further enhance the value of the books.

GLAUCOMA. Transactions of the Fifth Conference, March 6, 7, 8 and 9, 1960. Princeton, N.J. Edited by Frank W. Newell. 329 pp. Illust. Josiah Macy, Jr. Foundation Publications, New York, 1961. \$9.00.

These conferences, rather than "papers", are a well-edited record of the informal presentations of various experts in the basic sciences related to glaucoma and, more important, the numerous interruptions by other participants in the form of questions, criticism or comment. The Josiah Macy, Jr. Foundation has organized more than 20 conference groups which meet annually over several years, each meeting being limited to 25 participants representing a "multidisciplinary approach" to some medical problem.

One of the disturbing facts to the reviewer, obvious in the United States and evident in this book, is the increasing separation between so-called clinical medicine and the basic sciences related thereto. The publication of the Transactions is a commendable attempt to bridge that gap in some small manner.

The first presentation, aqueous composition and dynamics, deals in some detail with the evidence of differences in the composition of substances in the posterior chamber and the vitreous, pointing out effects of temperature gradient, time and distance. The confusion due to the transport of substances directly from the blood plasma (of the retinal circulation) into the vitreous, and diffusion from the iris into the anterior chamber, indeed the mathematical difficulties faced in nearly all modern medical research, is well shown.

Further chapters deal with anion transport in the rabbit eye; carbohydrate transport and diabetes (i.e. non-charged particle transport across the blood-aqueous barrier); the role of acetylcholine in nerve activity (most drugs used in the treatment of glaucoma are cholinergic); the histochemistry of cholin-

esterases; the anticholinesterases; pathogenesis of the glaucomatous visual field defects and systemic effect of prolonged acetazolamide therapy in human beings.

In spite of the aim of the Transactions to share "the conference process with a larger audience than could participate personally in the discussions", the reviewer feels the book will have limited appeal. It is essentially dealing with basic pathophysiology and as such makes exceedingly difficult reading for the clinical ophthalmologist—a summary at the end of each chapter would have helped.

MEDICINE AND THE NAVY 1200-1900. VOLUME III—1714-1815. Christopher Lloyd and Jack L. S. Coulter, with a foreword by Surgeon Vice-Admiral Sir Cyril May. 402 pp. Illust. E. & S. Livingstone Ltd., Edinburgh; The Macmillan Company of Canada Limited, Toronto, 1961. \$8.50.

This book will have strong appeal to the historian because of the meticulous documentation and research which went into it; but this is what bogs it down as a readable volume. Proof after proof is given of a fact or situation already well proved. It will no doubt appeal to all doctors who served in any Navy, as it shows the slow metamorphosis of the medical officer from a "quack" status to his later well-recognized position of authority within the Naval service. The usual tug-of-war between the layman executive attitude and that of the medical profession is well exemplified. For instance, it was forty years from the discovery that citrus juices would overcome scurvy until its routine use was authorized! On the other hand, it required but two years from Jenner's discovery of vaccination until this became an accepted procedure.

The average reader will, of course, be intrigued by many other facts revealed in the book, such as the ravages of disease, like scurvy and typhus, which caused infinitely more deaths than battle; the appalling living conditions aboard these early crowded wooden men-o'-war (Nelson's flagship the *Victory*, 186 feet long, with three decks, carried 900 men); that Lind as far back as 1762 distilled fresh water from sea water, thus enabling Wallis to circumnavigate the globe in 1766-68; that "bully beef" (from the French "bouille") was invented in 1806 for the French Navy. Admiral Kempenfelt's remark in 1780 should not go unnoticed: "If it were not for scurvy, men would be healthier at sea the year round as they have neither women nor spirits, the chief cause of their diseases."

CHINA DOCTOR. The Life Story of Harry Willis Miller. Raymond S. Moore. 215 pp. The Musson Book Company Ltd., Toronto, 1961. \$3.95.

This biography is the story of Harry Willis Miller to date. He is now in his early eighties and at this age has established a new hospital in Hong Kong.

Dr. Miller was born in Ohio and first achieved fame as a medical missionary in China. The story of his early struggles is now a part of history that seems unlikely to be duplicated. An expert surgeon, he was also a keen nutritionist and helped popularize soy beans in Asia and North Africa. His career has been fostered by his church, the Seventh Day Adventists, and as a physician he treated men in all walks of life.

This is an absorbing story and will be of particular interest to those who knew or would like to know of China in the earlier part of this century.

FIELD STUDIES IN THE MENTAL DISORDERS. Proceedings of the Work Conference on Problems in Field Studies in the Mental Disorders, February 15-19, 1959, under the auspices of the American Psychopathological Association. Edited by Joseph Zubin. 495 pp. Grune & Stratton, New York; The Ryerson Press, Toronto, 1961. \$7.50.

This book is a verbatim report of the proceedings of the Work Conference on problems in field studies in the mental disorders held February 15-19, 1959, under the auspices of the American Psychopathological Association. The 39 well-known and distinguished participants from the U.S.A., Britain and Europe were chosen because of their special interest in field studies and research in mental disorders. The purposes, procedures and objects involved in all phases of investigations in mental health were viewed with a keen eye to the future possibility of development in research. Some idea of the immensity of the problems discussed can be gained from a précis of the topics covered. The first day's session was devoted to the general theory of classification procedures and systems in biology with special application to nosology and nomenclature of mental disorders. On that day four papers were read with three formal co-discussants, which was followed by an extensive open discussion. The second day of the conference dealt with problems in defining units of study and variables in field investigations in mental and other diseases. The third day's topics were problems in obtaining comparability in field investigations in general health, the afternoon session dealing with methods of teaching and techniques applicable to field studies in mental diseases. During the fourth day summaries of conferences were read and discussed from the different points of view of social psychiatry, epidemiology, clinical psychiatry, public health administration, sociology, philosophy of science, biostatistics, population genetics and biometrics.

The wide range of theoretical and practical aspects discussed by many experts in their respective fields is quite impressive. The book is thought-provoking and requires more than casual reading. There is a frank and realistic appraisal of difficulties and limitations in the field studies in mental disorder on the one hand, yet the calibre and experience of the discussants creates a quiet but firm feeling of optimism as to the future of enquiry into these important problems. The comparison of the problems inherent in the study of health other than mental presents a realistic dimension of the inadequacies of psychiatric research. There is little doctrinaire psychiatric theorizing.

The book should be useful to postgraduate students in psychiatric disciplines.

PRINCIPLES AND TECHNIQUES OF REHABILITATION NURSING. 2nd ed. Florence J. Terry, Gladys S. Benz, Dorothy Mereness and Frank R. Kleffner. 344 pp. Illust. The C. V. Mosby Co., St. Louis, Mo., 1961. \$6.00.

This book is an easily read and attractively designed treatise on the rehabilitation of the chronically ill, the mentally ill, the orthopedically and neurologically handicapped to his proper place in society. It sets out to explain "the basic principles of rehabilitation nursing in detail" and to give "the special knowledge necessary in dealing with different handicapped individuals". The first two units deal with a historical survey and with community resources for vocational rehabilitation in the United States. This is well written and has been revised with up-to-date statistics in this edition. The third and fourth units are really nothing

more than descriptions of a composite specialized rehabilitation unit with emphasis on the place of the nurse in the rehabilitation team. The remaining four units describe rehabilitation of the aged, the child, the mentally ill, and the place of speech therapy in rehabilitation. A chapter on home modifications for the handicapped is new in this edition.

Material from this book could be utilized by speakers attempting to interest high school students in careers including medicine, psychology, occupational and physical therapy, speech therapy, medical social work, vocational training and nursing. It should be read by rehabilitation teams and nursing instructors.

Its defect, in the reviewer's opinion, is in not directing its message to the student nurse. The chapter on the amputee, for instance, states: "In order to obtain the most rapid shrinkage of the stump, it is sometimes necessary to apply the Ace bandage several times a day." There is no diagram showing the method of application of the bandage or further descriptive narrative. But several pages are devoted to the roles played by the psychologist, the social worker, the prosthetist, the physical and occupational therapist in the rehabilitation of the amputee. Similar examples throughout the book could be cited where the nurse's role is mentioned rather casually, to be followed by full accounts of activities by other personnel. This is not helpful to the teacher and it suggests to the nurse that she is not as important a member of the team as the other personnel, a thought which is manifestly far from the minds of the authors.

The authors are trying to do two things in this book: to point out the problems involved in rehabilitating the severely disabled to full employment and showing how these are being solved; and to describe nursing techniques which should be applicable to all types of disability and which can be performed by general duty nurses on general hospital wards. The authors have done an excellent job on the first of these goals.

INFORMATION PLEASE! For Women Only. Alfred Dreyfus II. 556 pp. Vantage Press, Inc., New York, 1961. \$7.50.

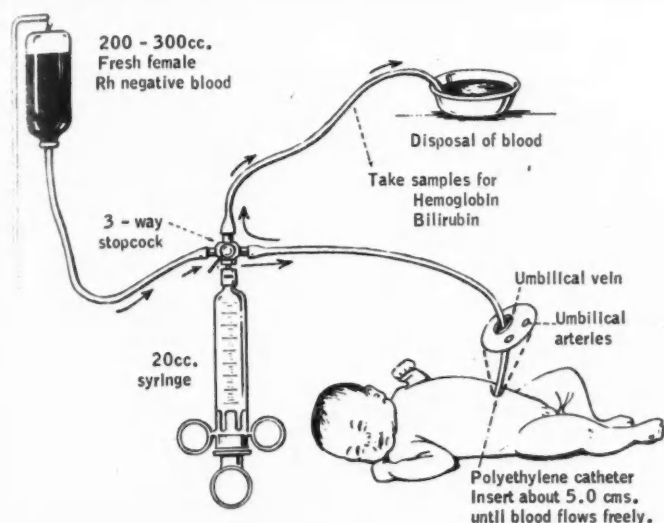
It is sometimes difficult for a young woman to find a book which will answer some of the questions in the field of sex knowledge that she would like answered. This book attempts to solve this problem by giving much pertinent data in the field of sex knowledge, useful to the young unmarried person as well as to the newly married couple.

The opening chapters are somewhat unnecessary and give the book a poor start. A conclusion reached by several lay women given this book to read was that if having a baby was so unphysiological and stressful, then having babies was not for them!

Otherwise, the book is easily read and understood. Many problems of sex are openly discussed, and useful recommendations made. Considerable space is given to a menstrual chart, the Dunhill Chart, whereby safe and unsafe periods are worked out for the individual.

Over one-half of the book, 365 pages, is made up of what the author calls time zones—whereby the mother-to-be would know about the changes in her condition as gestation advances. This seems an unnecessary waste of effort compared to the value received.

(Continued on advertising page 34)



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Edited by MICHAEL J. HOGAN, M.D., Professor and Chairman, Department of Ophthalmology, University of California School of Medicine, San Francisco; and LORENZ E. ZIMMERMAN, M.D., Chief, Ophthalmic Pathology Branch and Registrar, Registry of Ophthalmic Pathology, Armed Forces Institute of Pathology, Washington, D.C.; with 15 Contributors. About 800 pages, 7½"x11", with 703 figures, some in color. About \$30.00. *New (2nd) Edition—Ready in November!*



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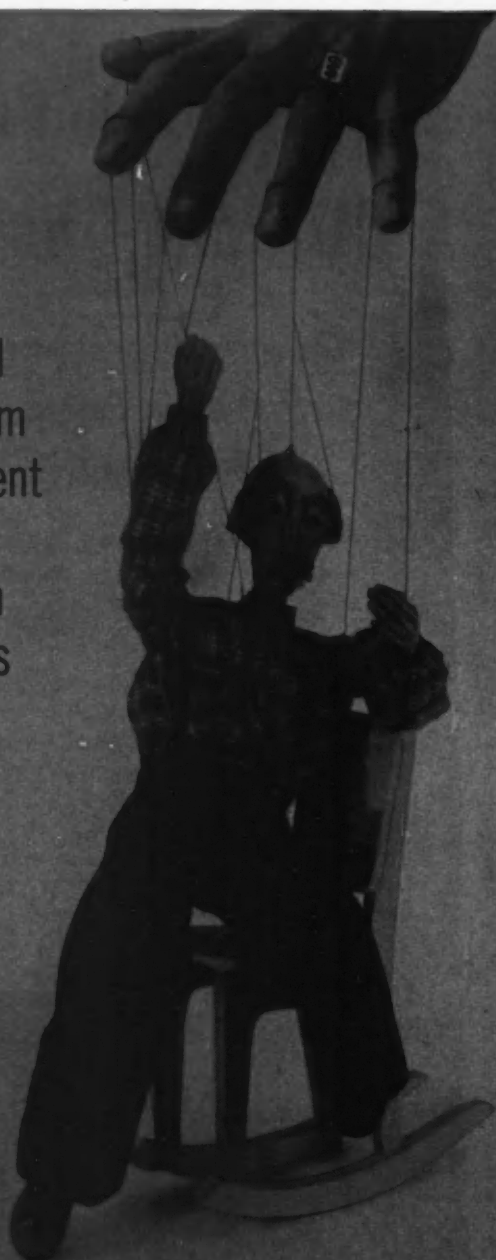
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MEDICAL NEWS in Brief

(Continued from page 956)

THE USE OF INCINERATORS IN URBAN AREAS

Part II.—Municipal Incinerators

Despite the cost of modern municipal incinerators, they offer the best solution for the disposal of refuse in the future according to Katz (*Occup. Health Bull.*, Vol. 16, No. 9, 1961). There are three types of incinerators: (a) refractory furnace type with mechanical grate; (b) steel construction, water-cooled, similar to a water-cooled boiler, also with mechanical grate; and (c) air-cooled incinerator with metal surfaces.

Modern municipal incinerators are generally of types (a) and (b), and these have been well described in the technical literature. Suitable air-pollution measures are incorporated to render the effluent invisible and odourless, and modern incinerator plants may be, and often are, located in the centre of the city or even in residential areas so that haulage distances are minimized.

It is important to operate municipal incinerators on a continuous 24-hour seven-day-a-week basis. This not only reduces the cost of maintenance by avoiding thermal shock to the refractories but gives more efficient burning conditions.

The residue from municipal incinerators may often be sold for road building, car parks, etc. Revenue may also be obtained from metal residue. For example, in Louisville, Kentucky, the annual incineration of 209,000 tons of refuse produces a solid residue of 54,000 tons and 10,000 tons of scrap metal. In addition to this, the waste heat may sometimes be used for raising steam which can be sold.

Smaller cities, however, may not wish to install these expensive incinerator plants. Open burning or dumps is unsatisfactory for the reasons stated previously. Considerable improvement may be obtained by using an air-cooled "Tepee" incinerator, consisting of a conical steel chamber which may be about 70 feet high and 60 feet in diameter, open at the top, in the centre of which the refuse is burned. The refuse is loaded through doors on the ground by a bulldozer or end loader, and after burning, the residue is pushed out through the other side. One of these incinerators will burn about

5300 lb. of combustible refuse per hour. With forced draught, supplied through air pipes in the floor, the combustion rate may be increased to 12,000 lb. per hour.

This type of incinerator costs about \$2500 initially and will burn 10 tons in eight hours at a cost of \$500 per ton-day, which is about one-tenth of that of the municipal incinerator. The life may be up to 10 years with occasional replacement of metal linings. The "Tepee" incinerators allow burning in any weather, and the smoke is emitted well above the ground level. They offer an improvement over open burning but are neither smokeless nor odourless. Improved designs incorporating air pollution control are available. In these the gas is ducted through a water spray cooler and scrubber and then exhausted through a fan into a stack. The wash water contains pollutants (about 10 g.p.m.) which will require suitable disposal. Modern plants of this type have been designed using a loading house with mechanical conveyer to eliminate the bulldozer.

Within the last few years, efforts by a committee representing the U.S. Gas Appliance Manufacturers Association, the City of Detroit Bureau of Air Pollution Control and others have led to the establishment of minimal acceptable performance requirements for gas-fired domestic incinerators. These stipulated domestic incinerator smoke limitations are similar to the general air pollution requirements of modern municipal regulations or by-laws as to smoke emission, fly ash particulate limits and odour requirements. The following details taken from a recent paper by Morton Sterling, Chief of the Detroit Bureau, indicates the design features of the new type of domestic incinerators that are now available.

The old model incinerators fall into two major categories—the so-called "low input" or dehydrating type and the "high input" class. The term "low input" is in a sense a misnomer. These units actually consume more gas per unit waste charge than the higher-rated units, since the burner remains in constant operation at its rated input.

A survey based on citizens' complaints in Detroit over a period of several years indicated that about 75% of the nuisance complaints against smoke and odour were directly attributable to the use of the dehydrating or "low input" in-

(Continued on page 42)

assisting
the physician
in the control
of the
problem child
in 9 out of 10
cases*



mellaril*

thioridazine

Mellaril, the safe, effective tranquillizing agent for agitation, excitation, hyperactivity, nervousness, tension, anxiety, temper tantrums, belligerence, sleep disorders, behaviour problems in school, at home, and at play.

* "202 children, ranging in age from early infancy to 15 years were treated with MELLARIL. THE DRUG PROVED EFFECTIVE IN OVER 90% OF CASES. MELLARIL was well-tolerated and no noteworthy side effects were observed."

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Ref.: M. Rentsch, MED. & HYG. 18: 140, 1960 (transl.)



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Clinical Internal Medicine (Thursday afternoons)	October 5-February 22
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Allergy	April 12, 13, 14
Endocrinology and Metabolism	April 16-20
Recent Advances in Therapeutics	April 23-28
Rheumatology	April 2, 3, 4
Cardiac Resuscitation	October 9
Infertility and Endocrinology	March 8, 9
Neurology, Clinical	March 20, 21
Obstetrics and Gynecology	January 24, 25, 26
Ophthalmology	April 23, 24, 25
Otolaryngology	April 19, 20, 21
Orthopedic Surgery (Fractures)	November 16, 17
Pediatrics	January 22, 23, 24
Psychiatry	February 19, 20
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Request for information may be addressed to:

Dr. John M. Sheldon, Director
Department of Postgraduate Medicine
1610 University Hospital
Ann Arbor, Michigan

MEDICAL NEWS in brief (Continued from page 41)

cinerators. The relatively poor performance of these units was due mainly to the smoldering condition in the waste bed. The low thermal input added just enough heat into the combustion chamber to maintain a low temperature combustion process. In addition, the gas mixture temperature was further depressed because of the continuous absorption of heat by the moisture in the waste as it was transformed from liquid to gas. The old high input unit, with its burner near the grates and simple updraft combustion chamber design, often caused a more dense smoke emission for a shorter time. For periods of a half hour or more after being charged with a heavy garbage load, the submerged burner often caused voluminous clouds of malodorous smoke to be distilled out of the moist mass above it.

The new-type incinerators are basically similar in design to one another. They follow the established pattern of commercial incinerators in which the primary combustion products flow into a secondary chamber where they are

passed through an enveloping flame. In most cases, the manufacturers have achieved this dual chamber feature with little or no increase in external size of the incinerator, and with no significant decrease in holding capacity. The burner is normally designed to discharge approximately one-third of its BTU output into the primary chamber, and two-thirds directly into the secondary chamber. A single venturi and control system feeds gas to the dual-purpose burner.

The down-draft design of the combustion chamber with its attendant low gas velocities in the secondary chamber is claimed by many manufacturers to produce a settling action which traps out the greatest percentage of the larger particles of fly ash before the products of combustion are discharged to the atmosphere. Test results and observations substantiate this claim, and the City of Detroit has conditionally approved installation of the new type of incinerator without requiring the conventional spark arrester. Field experience will determine whether this waiver is to become permanent.

ANIMALS FOR RESEARCH

The infrequent but recurring clash of wills between the large segment of society who wish to proceed, unhampered, with medical, veterinary and general biological research and the small segment who, through misapplied sympathies, obstruct this effort is reflected in a recent editorial entitled "Everybody Lost" (*Connecticut Med.*, 25: 576, 1961).

"Among the bills which died in 1960-1961 State Legislature was the Humane Research Bill, sponsored by the Connecticut Society for Medical Research and endorsed by the Connecticut State Medical Society. Who benefited from the loss of this bill?

The Dogs?

"The 14,000 dogs slaughtered in our pounds annually will still die—without hope of prolonging their own lives in laboratories, or contributing to the welfare of man, or their fellow creatures. The dogs needed for research and perfecting of surgical techniques will still be obtained, though at a maximum of effort and expense.

The Dog-Wardens?

"They must still be torn between their own consciences and the frantic fanatics who bedevil them to make sure that every dog in the pound is executed uselessly.

The Genuine Animal Lovers?

"As the vigorous support by the veterinarians indicated, people who really have animal and human welfare at heart are anxious to foster research into animal and human ailments and to prolong the lives of as many stray dogs as possible. Great diagnostic and therapeutic advances for humans are often perfected in animals and later used to improve the well-being of many more animals. Persons who desire healthier lives for their own pets know that defeat of this bill was bad for animals and bad for people.

The Voluntary Health Organizations?

"Higher costs for experimental animals will further strain their resources and diminish the effectiveness of their research grants.

The Government?

"Government agencies are deeply involved today in medical research. Larger expenses for animals will increase these research costs and force up the subsidies now being utilized for the training of medical students and graduate physicians. These expenses will affect not only the Federal Government but will impose a direct local tax burden if the University of Connecticut Medical School becomes a reality. Who pays when government expenses mount? The same old taxpayer—you and I, and even antivivisectionists!

The Researchers?

"New knowledge is not easily acquired under the best of conditions. Every added difficulty will prolong the time to find new pieces in the great jig-saw puzzle that is science."

SURGICAL APPROACH TO PULMONARY EMPHYSEMA

Brantigan, Kress and Mueller classify pulmonary emphysema into primary and secondary types, each of these being further subdivided

into generalized and localized groups (*Dis. Chest*, 39: 485, 1961). In the localized type of pulmonary emphysema there is airway obstruction only to the area involved by the disease; the remainder of the lung is normal. In the generalized or diffuse type of bilateral pulmonary emphysema there is generalized bronchiolar-alveolar airway obstruction to all lung tissue, whether or not there are blebs or bullae or both. Bronchiolar-alveolar airway obstruction in pulmonary emphysema is due to the partial loss of the physiologic principle of centrifugal pull on the bronchioles, thus holding them open.

It is considered that surgery directed at reducing lung volume by sacrifice of functionally useless pulmonary tissue can in some measure restore this partially lost physiologic principle, and result in more effective bronchial air flow. Tenacious sputum in small amounts is characteristic of pulmonary emphysema. The character of the secretion can be altered by denervation of the lung and this has been shown in the authors' work.

Of 56 patients operated upon for primary pulmonary emphysema, 42 (75%) are improved. When there results a loss of some of the improvement produced by operation on one lung of a patient with primary pulmonary emphysema, this loss of function is usually the result of further degeneration of the unoperated lung. In none of the patients reported in this series was there detectable evidence of further progression of the disease in the operated lung. The longest follow-up was eight years. Undoubtedly, some patients will in the future show signs of further progression of the disease.

CHOLESTEROL PNEUMONITIS

Cholesterol pneumonitis is a specific type of inflammatory reaction characterized macroscopically by a yellow appearance of the parenchyma, and microscopically by intra-alveolar aggregates of lipid-containing macrophages and a chronic interstitial pneumonitis. It is usually found in lungs showing bronchial obstruction or active inflammatory disease, but rarely it is found when neither of these conditions is present. Particular reference has been made in a paper by

Reid, Cairney and Oliver (*New Zealand M. J.*, 60: 134, 1961) to those cases of cholesterol pneumonitis in which obvious initiating factors are absent. Over a seven-year period they encountered five such cases in which neither bronchial obstruction nor other primary disease was found, which they have described in detail.

Most commonly the bronchial obstruction is due to bronchial carcinoma; occasionally it has been due to adenoma or impacted hyda-

tid membranes. It has been observed in relation to bronchiectasis, chronic abscesses and actinomycosis. Although the type of case without obvious bronchial obstruction or active primary disease is rare, when this type occurs its clinical and radiological pictures are those usually associated with bronchial carcinoma.

Macrophages, which are the intra-alveolar cells normally responsible for clearance of degener-

(Continued on page 44)

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MEDICAL NEWS in brief
(Continued from page 43)

ating epithelial cells, red cells and proteinaceous fluids, accumulate as a result of obstruction at any level of the bronchial tree, including functional impairment of alveolar clearance mechanisms. The latter type of blockage may be due to pleural and pulmonary fibrosis which may follow inflammatory episodes occurring in the absence of tumour or other continuing disease. The lipid contained by mac-

rophages is derived from digested cell debris and from the lipoproteins of exudate. The relative preponderance of cholesterol is due to its insolubility and retention, as compared to phospholipids and other lipids which are removed. The irritant effect of these substances perpetuates a low-grade inflammation and continued macrophage response which is terminated by obliterative fibrosis or by suppuration.

**SCLERAL CONTACT LENS
DEPARTMENT: UNIVERSITY
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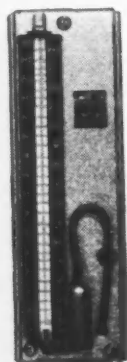
A Scleral Contact Lens Department has been opened at the Toronto Western Hospital under the auspices of the University of Toronto. Its purpose is to help those who are not aided by ordinary spectacles and to give protection or cover cosmetic blemishes. It will not supply lenses to patients simply desiring to avoid the wearing of spectacles.

**SIXTH ANNUAL
CLINIC DAY:
ST. JOSEPH'S HOSPITAL,
TORONTO**

The following program will be presented at the Sixth Annual Clinic Day at St. Joseph's Hospital, Toronto, on Wednesday, November 8:

Morning Session, 9.30 a.m.
(Chairman, Dr. John A. Baglieri, Department of Obstetrics and Gynecology): Opening Remarks—Dr. Charles Knowlton, Chief of Staff of St. Joseph's Hospital; "Growth Problems from an Endocrine Viewpoint"—Dr. Robert Volpé, Department of Medicine; "Home Management of the Infectious Diseases of Childhood"—Dr. Leo Shack, Department of Pediatrics; "Adult Foot Problems"—Dr. Glen MacDonald, Department of Orthopedics; "The Pathogenesis of Atherosclerosis"—Dr. J. Fraser Mustard, Sunnybrook Hospital, Toronto; "The Etiology of Enteric Diseases"—Dr. L. Mautner, Department of Pathology.

Afternoon Session, 2.00 p.m.
(Chairman, Dr. Frank McKenna, Department of General Practice): "The Management of Serous Otitis Media"—Dr. J. Gollom, Department of Otolaryngology; "Jaundice in the Young Infant"—Dr. A. Sask-Kortsak, Hospital for Sick Children, Toronto; "The Surgical Aspects of Spontaneous Intracranial Hemorrhage"—Dr. W. Horsey, St. Michael's Hospital, Toronto; "Some Aspects of Maternal Mortality"—Dr. B. Waldie, Department of Obstetrics and Gynecology; "Acute Gastrointestinal Emergencies of Pregnancy"—Dr. A. McIntyre, Department of Surgery; "Cineradiography—Clinical Considerations"—Dr. W. Roy, Department of Radiology.



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